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TELEPHONE ENGINEER & MANAGEMENT

THE NATIONAL TELEPHONE MAGAZINE

DECEMBER 15, 1942

Keeping Line Trucks Fit For Duty Is the First Step in Wartime Line Maintenance With Reduced Manpower

Keeping step with emergency demands of line construction and maintenance in the face of a constantly diminishing supply of trained manpower presents a real problem to many utilities.

One of the first and most important steps in meeting the problem is to keep every line truck fit for duty — keep them working at top-notch efficiency. Ordinary peacetime maintenance methods are not sufficient — constant, watchful care of every line truck is needed to add to the work range and capacity of skeleton line crews — to enable them to cover more ground — to get more work done in less time.

And equally important, thorough preventive maintenance is essential to conserve critical materials and replacement parts — gasoline — oil — tires.

Alert to this need, FWD branch and dealer organizations are ready and equipped to aid utility truck service and maintenance departments in carrying out a complete truck conservation program.

OFFICIAL STATION
U.S.
TRUCK
CONSERVATION
CORPS

FWD
TRUCKS

SEE YOUR FWD BRANCH OR DEALER

To gain all the service and exceptional performance FWD's were built to give — see that your truck maintenance men check with the nearest FWD branch or dealer as often as they can. See that they have full information about FWD's progressive interchangeability of improvements and vital parts — how worn parts and units subject to heavy wear and tear can be progressively replaced with modern equipment and trucks kept in action at lowest cost.

On any maintenance problem it's important to consult with your FWD branch or dealer . . . they are equipped with the facilities, skill, and experience to put new life into even the oldest FWD—no matter how "scarred" with long years of service.

THE FOUR WHEEL DRIVE AUTO COMPANY, Clintonville, Wis.

Canadian Factory: KITCHENER, ONTARIO

A Pledge

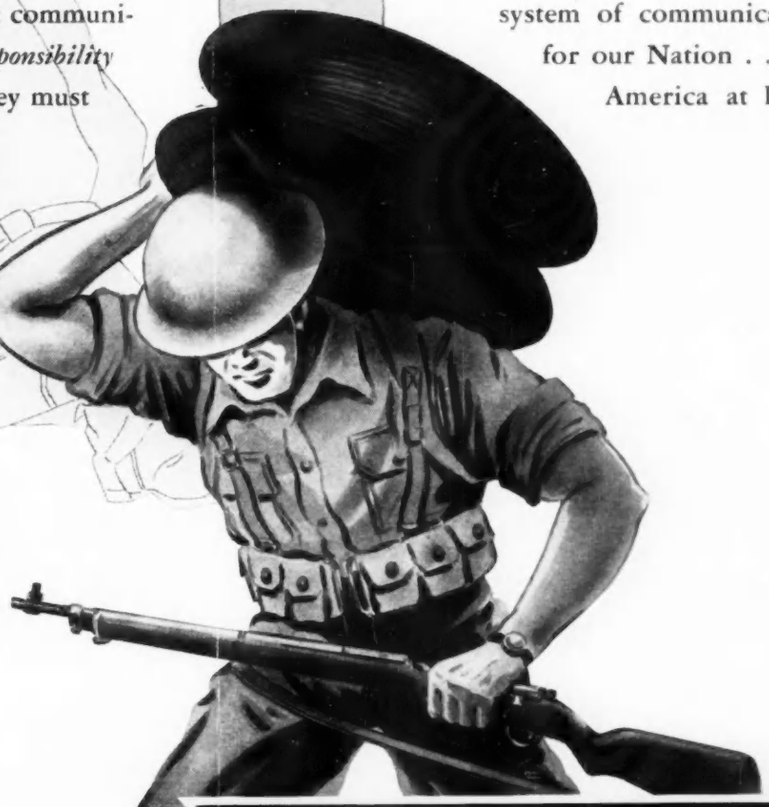
TO THE MAN WHO MAY NOT SEE THIS AD

Not many of the men to whom this advertisement is dedicated will see it. For they are the men who once played their part in our *peacetime* system of Communications and who now are giving their knowledge, their skill . . . even their lives . . . to the establishment and maintenance of *wartime* Communications, in the service of the United States Army Signal Corps all over the globe.

Once, it was our privilege to supply these men the wires and the cables with which they wove the pattern of the world's greatest communications system. Today, it is our *responsibility* to provide them the materials they must have in order that our military operations, now world wide in scope, may move on to Victory.

The workers at Whitney Blake are proud that their equipment and their knowledge of wire making enables them to meet the exacting specifications of the Signal Corps. Right now, their job is to help in the Winning of the War and to that they pledge their supreme effort.

But afterward, the new discoveries in the art of communications, made in the Factory and on the Front, will mean an even better system of communications for our Nation . . . for America at Peace.

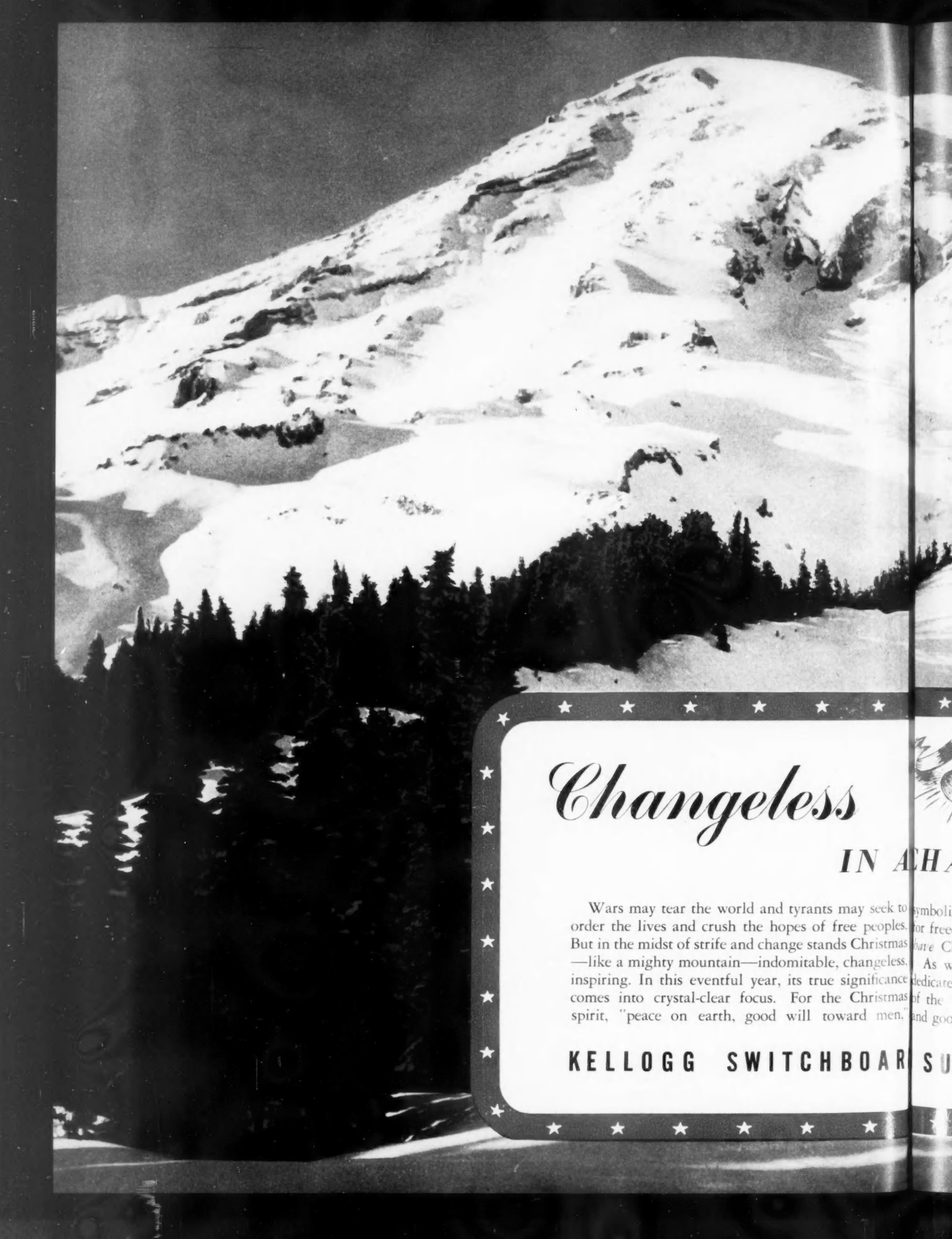


Drop Wire • Duct Wire • Inside Wire • Tree Wire • Field Wire • Shielded Radio Wires and Cables • Plastite Insulation

Distributed by GraybaR ELECTRIC COMPANY

THE WHITNEY BLAKE CO.
New Haven, Conn.
Well Built wires since 1899

Entered as Second Class Matter at the Post Office at Pontiac, Ill., under the Act of March 3, 1879.



Changeless

IN CHA

Wars may tear the world and tyrants may seek to order the lives and crush the hopes of free peoples. But in the midst of strife and change stands Christmas —like a mighty mountain—indomitable, changeless, inspiring. In this eventful year, its true significance comes into crystal-clear focus. For the Christmas spirit, "peace on earth, good will toward men."

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As w
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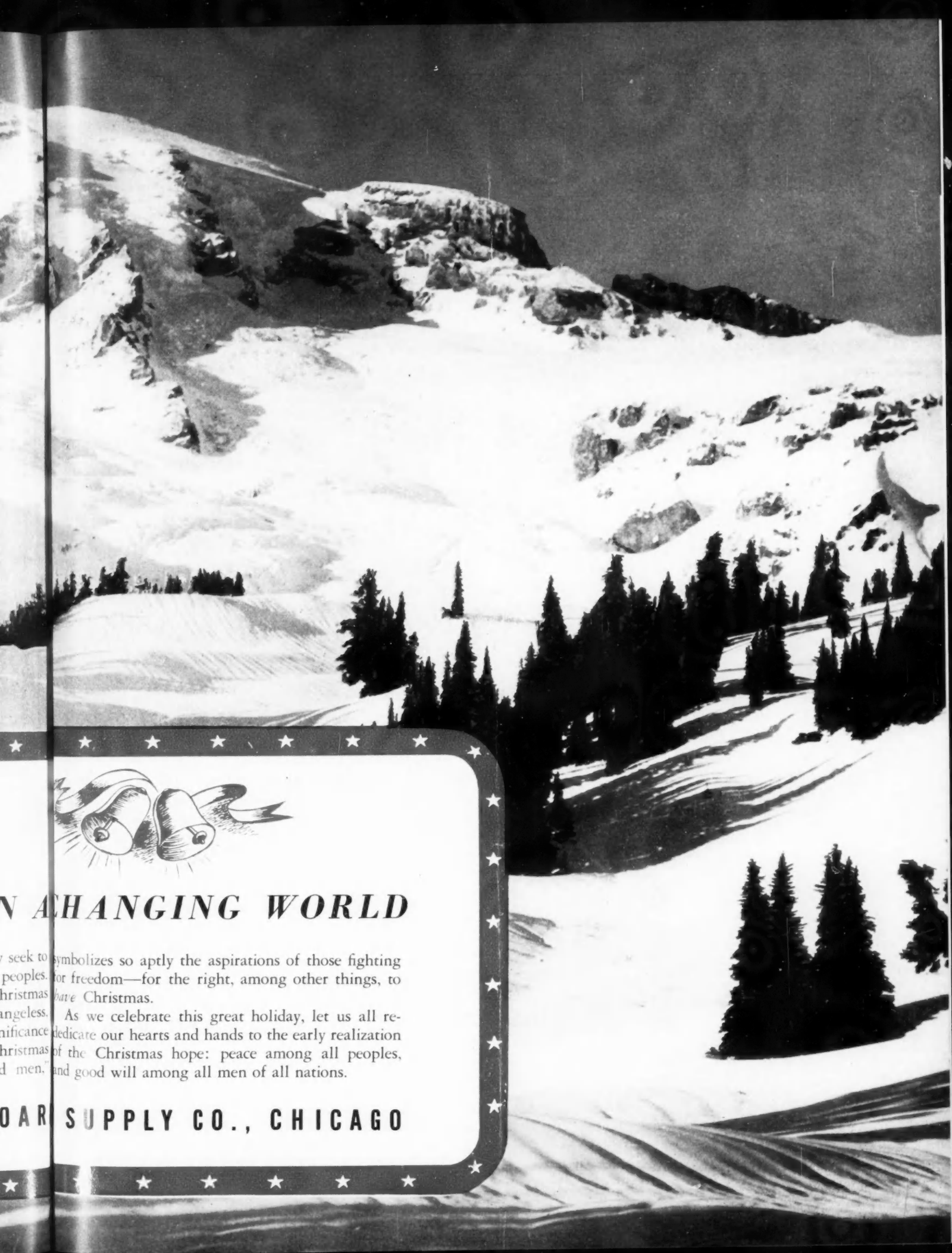
KELLOGG SWITCHBOAR SU



N A CHANGING WORLD

y seek to peoples. hristmas angeless. nificance hristmas d men."

symbolizes so aptly the aspirations of those fighting for freedom—for the right, among other things, to *have* Christmas.

As we celebrate this great holiday, let us all rededicate our hearts and hands to the early realization of the Christmas hope: peace among all peoples, and good will among all men of all nations.

OAR SUPPLY CO., CHICAGO

EXTRA EDITION

Telepho

An Advertisement of Leading Supply Manufacturers Whose Prod Distri

IN THE WAR EFFORT, D

YOUR LINES ENDURE WITH INDIANA CRAPO STEEL STRAND WIRE

Its comparatively low first cost, its adaptability to the job at hand and its long, satisfactory life make Indiana Crapo Steel Strand Wire the first choice with telephone men everywhere. Lasting protection against corrosion is provided by the heavy, ductile, tightly-adherent zinc coating applied by the famous patented Crapo process. The superior tensile strength of steel, the ability to outlast normal needs, plus the Crapo protection against corrosion make this wire the safest and surest bet for all construction work.

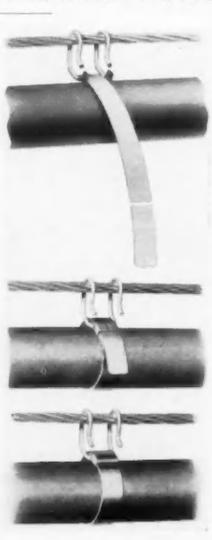
ODD.....BUT TRUE !

IN DRILLING OIL WELLS- A CYLINDRICAL METAL TUBE CONTAINING A PHOTOGRAPHIC DEVICE TAKES A PICTURE OF THE PATH OF THE DRILL. "EVEREADY" DRY BATTERIES ARE USED TO LIGHT A LAMP AND TRIP THE SHUTTER OF THE CAMERA.

FACTORY-TESTED- AND HOW ! COFFING SAFETY-PULL RATCHET LEVER HOISTS ARE TESTED AT 100% OVER THEIR RATED CAPACITY !

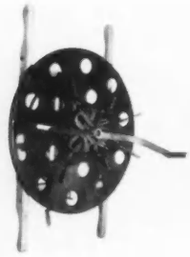
TELEPHONE NUMBERS ARE THE PROPERTY OF THE TELEPHONE COMPANY, ACCORDING TO AN OHIO COURT RULING.

National Zinc Wraps are Preserving Wartime Cable



National Zinc Wraps not only save installation time but also eliminate damage to the cable and all wear that threatens when the cable is in contact with the messenger strand. To hang cable all you do is wrap the strap tightly around the cable, press down the clamp, and the job is done. These cable supports follow the standard practice of suspending the cable below the strand. Eliminate damage to your cable and save vital man hours by standardizing on Zinc Wraps. Available in 5 sizes.

Matthews Adjustable Reel Pays Out and Takes Up Wire



This Matthews Adjustable Reel may be used both for paying out and for taking up wire. In the latter use, old wire is coiled perfectly without kinks. The reel is ruggedly built with no sharp edges to damage the wire. Matthews Adjustable Reels are available with or without brake, for coil sizes thirteen to eighteen inches inside diameter. Here is a time saving, troublefree, long-lived tool that will pay dividends. Make certain it will be on the job for you in 1943.

Kellogg's Famous No. 5 Is Tape That "Stays Put"

Time is precious today. Things have to be done right the first time. That's why it pays to use good tape —like Kellogg's famous No. 5. For this is the stickin'-est, toughest, smoothest tape a telephone man can lay his hands on. And it has been that for many years. It stays fresh through all the seasons, resists oxidation, and makes the job right . . . the first time, and for a long time to come. Furnished in black, in ¾" and 2" widths. Specify Kellogg No. 5 Friction Tape on your next order.

Phone Facts

EXTRA EDITION

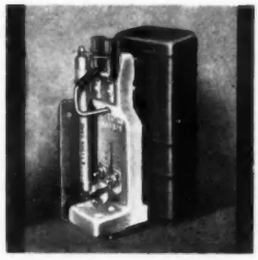
Distributed by the Kellogg Switchboard and Supply Company

T, DEPEND ON KELLOGG

Kellogg Koiled Kords Stretch Out 60 Inches

Here is a product every phone user likes. Kellogg Koiled Kords work like a coil spring and stretch out 60 inches. Of great importance to you is the fact that these cords save telephone breakage because they rarely tangle with other objects or catch under desk or table corners. The action of Kellogg Koiled Kords is entirely secured by molding the outer rubber covering into the permanent coiled shape. This patented construction makes it the longest wearing cord of this type.

Type "O" Sub-Station Protector Adopted By Leading Companies



The universal Type "O" Sub-Station Protector, product of Cook Electric Company, because of its convenience and satisfactory service has been widely adopted by successful operating companies. It is their standard! This protector is suitable for indoor and outdoor installation. It has an indexing mounting bracket which makes it possible to install the bracket separately and allows the protector unit to be turned on the bracket for convenient wiring. It also has Tru Gap lightning discharger, fuse protection, non-corrosive cover and phosphor bronze fuse clips.

IRONITE CONSERVES WAR MATERIALS, MEETS MOST RIGID REQUIREMENTS

This is the second war in which Ironite Drop Wire has saved critical materials by its long life. Although it lasts longer, it meets all service requirements. It is unusually strong, effectively resisting sleet loads on long spans. Other important features are high conductivity—Ironite No. 18 BWG is equal to No. 22 B&S copper in drop wire

lengths; has insulation with 10 times required dielectric qualities; is flexible—works and ties easily. To help you meet rigid budgets in replacements you will find Ironite most reasonably priced. Specify Ironite Drop Wire for good service and low cost.

"WT" Insulators Stand Temperature Variations

Outstanding characteristics of "WT" Insulators are resistance to weather fluctuations; crystal clarity of glass, which guards against malicious breakage; accurate gaging to assure true pin fit; exceptional durability. Armstrong Cork Company leaves nothing to guesswork in making "WT" Glass Insulators. Every stage of production, is automatically controlled . . . every insulator conforms to A. S. T. M. standards. When you specify "WT" insulators you assure top-notch service.

National Emergency Demands Only Best in Experience, Materials and Service

The men behind the Nation's communication lines long ago established a high reputation for efficiency. In every type of weather and business cycle, they have striven mightily to keep the service on a high plane.

Today, with the world at war, no greater responsibility has ever faced the telephone field. The Armed forces on land, sea and in the air must have the maximum support of industry, business and agriculture to speed Victory. The demand for speed, speed and more speed has its very foundation in adequate, clear and uninterrupted telephone communication of every type.

By placing your requirements in Kellogg's experienced hands, insuring immediate service; by selecting materials and equipment of leading manufacturers, which is fully recommended by Kellogg engineers, you can be sure you are taking the right steps to avoid line trouble—so costly to our all-out war effort.

Kellogg's 50 strategically-located coast-to-coast warehouses plus a superior organization assures efficiency and speed in filling any order.

Then the enviable reputation enjoyed by Kellogg for business integrity is more important than ever now. Telephone men like to know and deal with a company that is ever ready to stand behind the products it sells. So every Kellogg line supply item is doubly guaranteed: first by its own manufacturer, and then by Kellogg.

To our Readers all over the world:

A

Merry Christmas

and

World Peace

in

1943

The Staff
of
Telephone Engineer

TELEPHONE ENGINEER

MANAGEMENT • ENGINEERING • MAINTENANCE

& MANAGEMENT

Vol. 46, No. 12 DECEMBER, 1942

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SERVING THE SIX BILLION DOLLAR TELEPHONE INDUSTRY

Founded in 1909

Office of Publication, Pontiac, Illinois. Executive and Editorial Offices 7720 Sheridan Road, Chicago, Illinois. Phone Rogers Park 3040. RAY W. SMITH, Editor; ROY F. SMITH, Adv. Manager, DON C. SORENSEN, Sales Prom. Mgr. Subscriptions: U. S., Cuba, Mexico, $1.50 Per Year; Canada, $2.00; In all Other Countries, $3.50. Single copies, U.S.A., 15 cents. All subscriptions should be sent DIRECT to 7720 Sheridan Rd.

THESE are the real footsteps to Victory . . . the marching feet of fighting men, now heard across the embattled continents. Yet these men cannot fight unaided. Each step a soldier takes needs the fullest backing here at home. We must sacrifice, we must work, we must save.

Here, for example, are four very simple conservation steps which you can take on the march to final victory. Follow them and make your storage batteries last longer. Buy to last, and save to win!

STEP No. 1 Keep adding approved water at regular intervals. Most kinds of local water are safe in an Exide Battery. Ask us if yours is safe.

STEP No. 2 Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.

STEP No. 3 Keep the battery fully charged—but avoid excessive overcharge. There's always a right way to do any job, and a storage battery will last longer when charged at its proper voltage.

STEP No. 4 Keep records of water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings. *Know* what's happening!

If you wish more detailed information, or have a special battery problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for Booklet Form 3225.

THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Exide
TELEPHONE BATTERIES

PROTEK-SORB DESICCANT

MEETS THE NEEDS OF YOUR MAINTENANCE DEPARTMENT

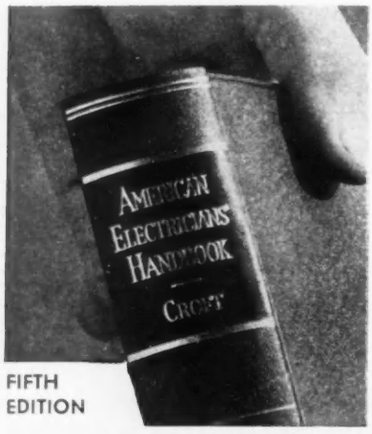
Protek-Sorb Desiccant assures trouble-free cable splices because it dries them FASTER, EASIER and BETTER! Protek-Sorb has more than twice the moisture-capacity of other desiccants—assures a quicker return to normal insulation resistance. Does away with dangerous "boiling-out" and time-wasting "oven-drying". Your regular jobber can supply you.

THE DAVISON CHEMICAL CORPORATION

Industrial Sales Department

BALTIMORE • MARYLAND

Get the right answer FAST



for more efficient, profitable handling of

EVERY TYPE OF PRACTICAL ELECTRICAL JOB

Thousands of men have used previous editions of this famous handbook as a working guide of everyday usefulness. Now it is ready to help you too, in a big revised 5th edition — 600 pages larger—brought up to date—*more than ever the one great pocketbook of practical electricity for you.*

Croft's AMERICAN ELECTRICIANS' HANDBOOK

Revised by CLIFFORD C. CARR, Head, Electrical Engineering Dept., Pratt Institute. 1600 pages, 5x7½, 1177 illustrations, $5.00.

This book is packed from cover to cover with the facts which every man engaged in electrical work needs to have constantly at hand. From clear explanation of the fundamentals of electricity, to suggestions for remedying troubles of electrical equipment, the information is the kind that helps practical electrical men select and install commercial electrical apparatus and materials intelligently for the performance of specific services, operate electrical equipment efficiently, and maintain it at high operating efficiency.

COVERS:

- conductors
- circuits and circuit calculations
- general electrical equipment and batteries
- generators and motors
- transformers
- outside distribution
- interior wiring
- electric lighting
- etc.

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TELEPHONE ENGINEER & Management

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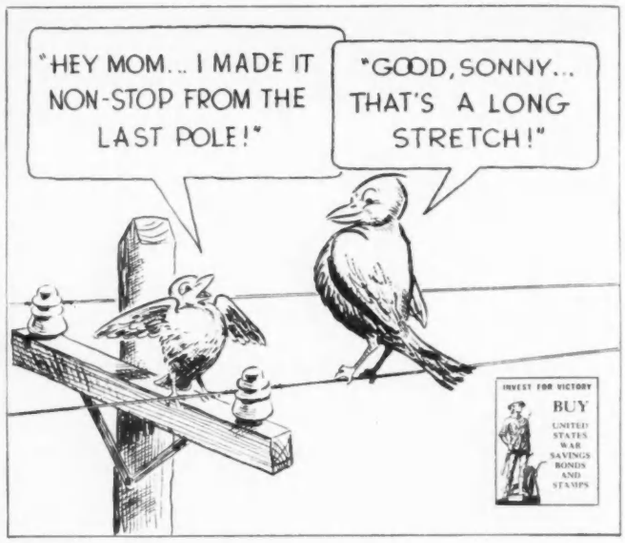
CHICAGO


"HEY MOM... I MADE IT NON-STOP FROM THE LAST POLE!"
"GOOD, SONNY... THAT'S A LONG STRETCH!"
INVEST FOR VICTORY
BUY
UNITED STATES WAR SAVINGS BONDS AND STAMPS

IT'S a long way from pole to pole when AMERTEL High Tensile Wires are used. AMERTEL-85 and AMERTEL-135 have the extra strength necessary for long spans. This greater strength means less troubles arising from heavy ice and wind loads. Telephonic transmission qualities are equal or superior to wires of standard "BB" grade.

AMERTEL Wires — including standard "EBB," "BB," and "Steel" grades—as well as AMERSTRAND Steel Strand, are all produced to a high standard of "Controlled Quality." Every production step—from ore to finished product—is under strict control and experienced supervision. The zinc coating is applied by a special process which forms a tight chemical bond with the steel. This prevents cracking or peeling of the galvanizing.

Every resource of the American Steel & Wire Company is at the service of the nation. Every pound of steel and every foot of wire is on call for war purposes. Therefore, if you encounter any difficulty in getting wire, we know you will understand that our products are going into the production of war materials.

LOOK FOR THESE TAGS

They are placed for your protection on every coil of AMERTEL Telephone and Telegraph Wire and AMERSTRAND Steel Strand.

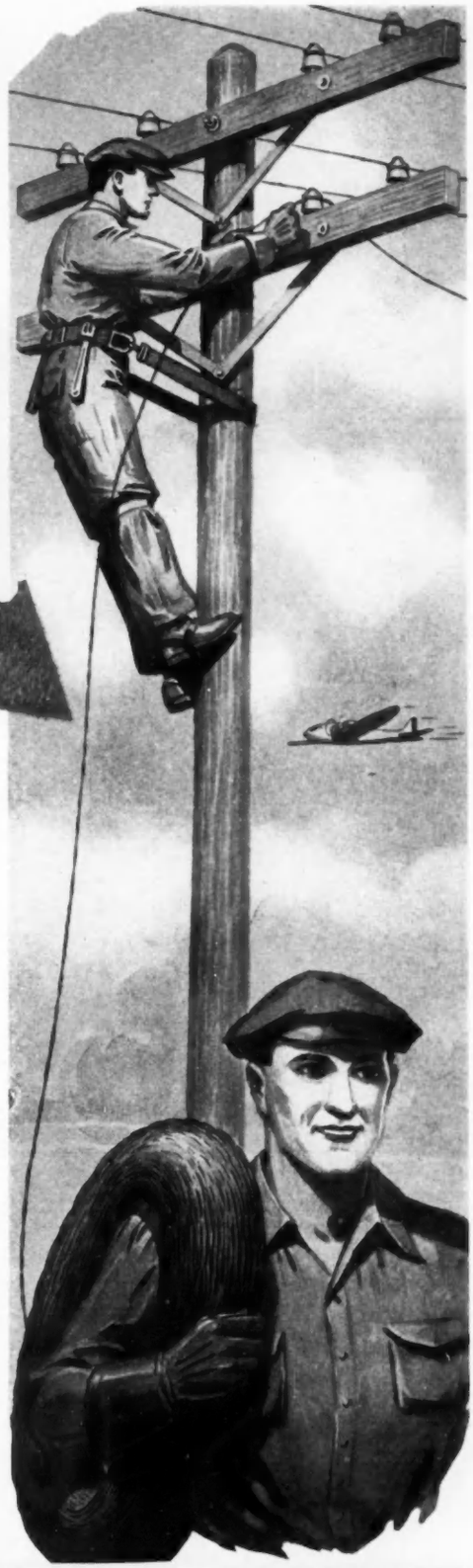
AMERICAN STEEL & WIRE COMPANY

Cleveland, Chicago and New York

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

Signal Corps soldiers erecting field wires
Photo by U. S. Army Signal Corps



War demands make it necessary for you to order well in advance of your actual requirements.

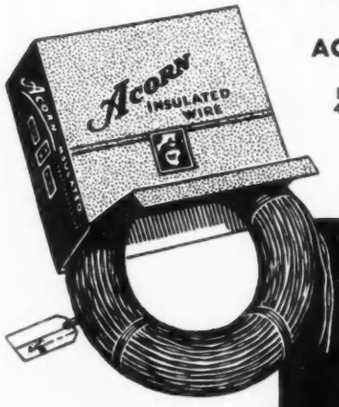
Drop Wire
Bridle
Interior
Tree
Ground
Switchboard
Pothead
Cable Terminal
Instrument
Fixture
Buried Wire

A NEW Tomorrow is on its way for Telephony — a Tomorrow that will bring to this far-reaching industry undreamed of improvements, wrought in the Titanic Laboratory of War. Advanced formulas. Better ways of processing. Methods of manufacture for turning out products that speed up installation and promote long life.

For many years, in war and peace, Acorn's facilities have been continuously used by the U. S. Signal Corps.

New developments in material and technique, accelerated by the war effort, will be made available to you when Victory is won and restrictions are lifted.

ACORN INSULATED WIRE CO., INC.
225 King Street, Brooklyn, N. Y.
LEICH SALES CORP.
427 W. Randolph St., Chicago
LINDSAY SUPPLY CO.
4815 Superior Ave., Cleveland



A Name that Commands Respect

ACORN INSULATED WIRE

TIMES HAVE CHANGED. The telephone service she enjoys today is a lot different from the kind she remembers as a girl. And much of the credit for this modern service properly should go to the many suppliers to the telephone industry. Prominent among them is the General Cable Corporation whose development work in cable has helped to bring telephone communication to its present high plane.

GENERAL CABLE

Paper Telephone Cables

DISTRIBUTED BY

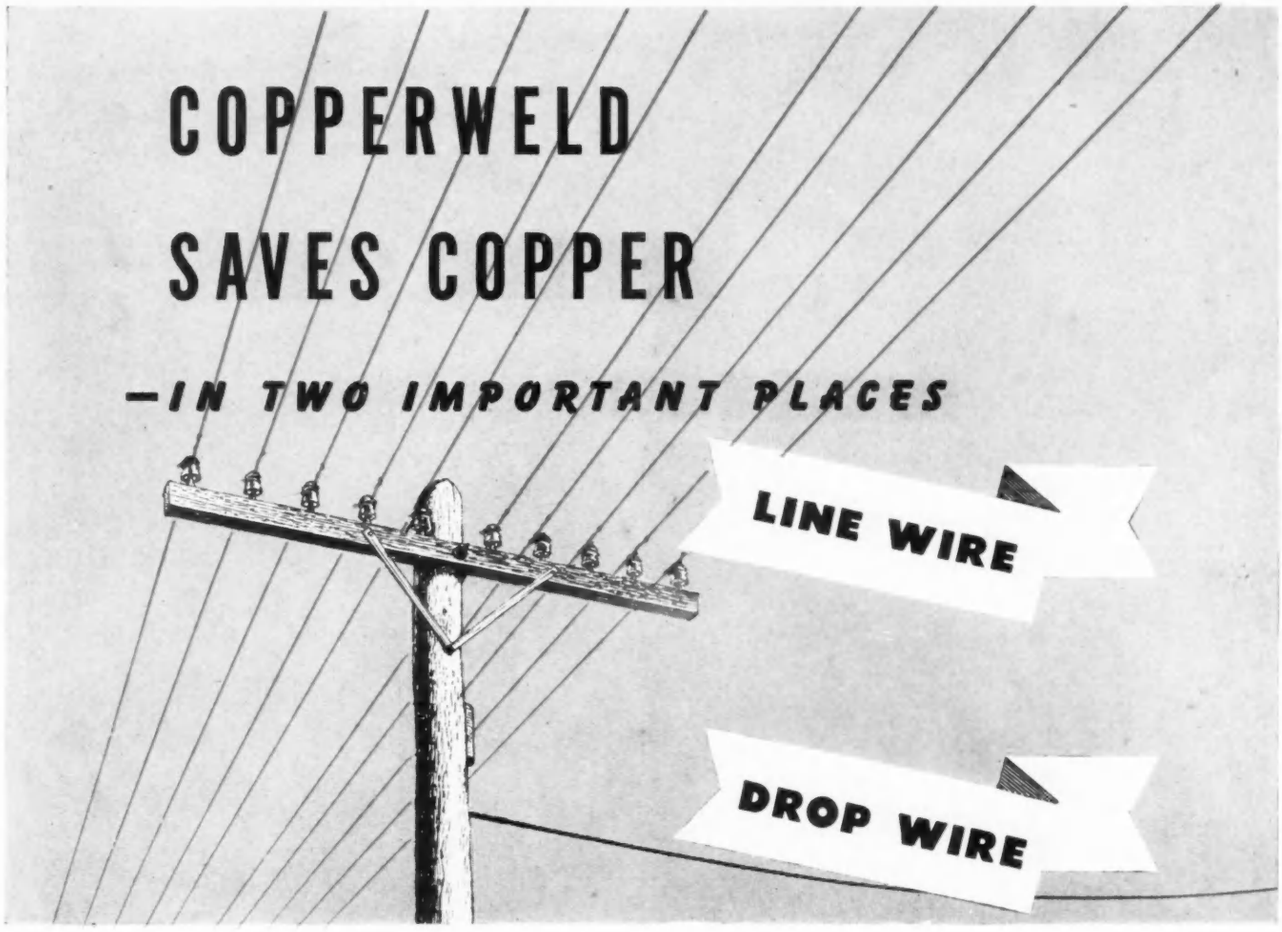
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

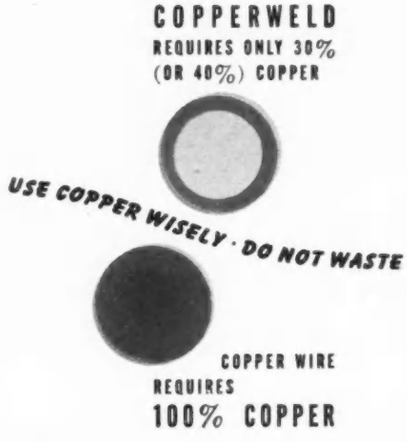
1033 WEST VAN BUREN STREET · CHICAGO, ILLINOIS

BRANCH WAREHOUSES AT DALLAS, KANSAS CITY, LOS ANGELES, RICHMOND (VA.) AND SAN FRANCISCO

COPPERWELD SAVES COPPER

—IN TWO IMPORTANT PLACES



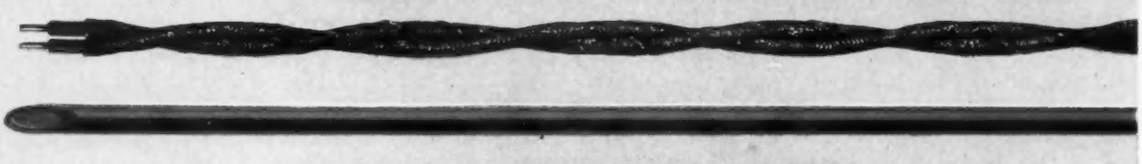


Telephone companies are saving copper with Copperweld Drop Wire and Line Wire and they are gaining these savings without sacrificing the quality of their service.

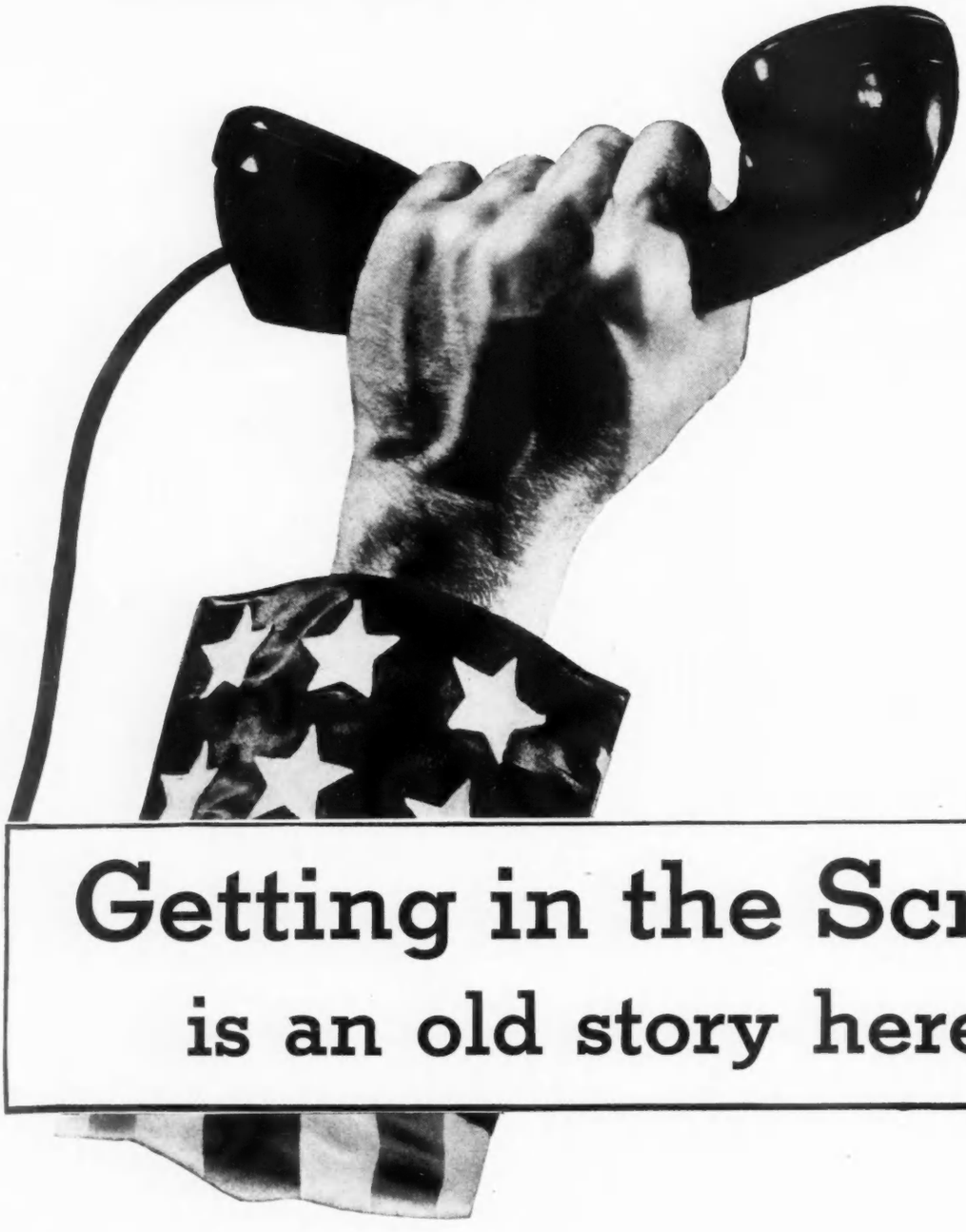
Copperweld Line Wire has ample conductivity and strength and has the same rust-resisting life as solid copper. Copperweld Drop Wire is the strongest drop wire made. Each No. 18 wire has a breaking strength of 170 pounds – 340 pounds for the pair. Save copper and get good service with Copperweld Drop Wire and Line Wire.

Copperweld Line Wire and Drop Wire are distributed by American Automatic Electric Sales Company, Graybar Electric Company, Kellogg Switchboard and Supply Company and Stromberg-Carlson Telephone Manufacturing Company.

COPPERWELD



COPPERWELD STEEL COMPANY *GLASSPORT, PA.*



Getting in the Scrap is an old story here

The advertisement reproduced on the opposite page appeared 17 years ago. It describes a "battle against waste" that was important to the nation then and is far more important now.

Each year, Western Electric salvages metal weighing more than a battleship. This refined metal once went back into new telephone equipment. Today it reports to the armed forces — in Western Electric communication apparatus, and in planes, tanks, guns and ships.

Published in 1925

Tiny pieces of platinum, saved from telephone apparatus no longer in service, are refined to be used again.

Saving labor, even in the task of salvaging waste. The lifting power of a magnet is here put to work, moving tons of scrap iron.

Cast iron *and* platinum *—precious metals both!*

If a pound of platinum is worth saving, why not a pound of scrap iron? This thought is the magic touchstone that makes even base metals precious at the Western Electric telephone factories.

But here modern alchemy is only one part of a highly organized battle against waste. Lost time, false motions in manufacturing, inefficient ways yield one by one.

Nor is this the work of just a few years. Your telephone today stands as a symbol of progress because generations of Western Electric experience have helped to make it so.

Western Electric

SINCE 1869 MAKERS OF ELECTRICAL EQUIPMENT

Stromberg
MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION

HELP COMING!

In 1857, the distant wail of bagpipes of an approaching army brought the first news of rescue to British defenders of besieged Lucknow in India.

HEARD A FEW MILES IN 1857

Less than a century ago, wartime communications were not only uncertain, but very limited in their range. For example, when the British were besieged at Lucknow, India, the first knowledge they had of a relieving force was the distant wail of bagpipes.

Under today's conditions, however, efficient communications would enable the beleaguered forces to be in constant touch with their headquarters, and their headquarters with them.

HEARD THOUSANDS OF MILES TODAY

Furthermore, using modern communication methods, word of coming assistance may be conveyed *instantly* to virtually any point on the globe *where people may freely listen,* as in the case of a program transmitted this year from Taunton, Massachusetts, to Taunton, England. Through the means of this broadcast, listeners in Taunton, England, heard the encouraging roar of a steel furnace in Taunton, Massachusetts, making munitions for embattled Britain.

Stromberg-Carlson is proud of the part it is playing in producing the much-needed materials for wartime communication. American forces all over the globe are benefiting from the superior communication equipment a background of 48 years in the communication field enables the Company to produce.

In telephones, sound systems, and radios . . . *"There is Nothing Finer than a Stromberg-Carlson."*

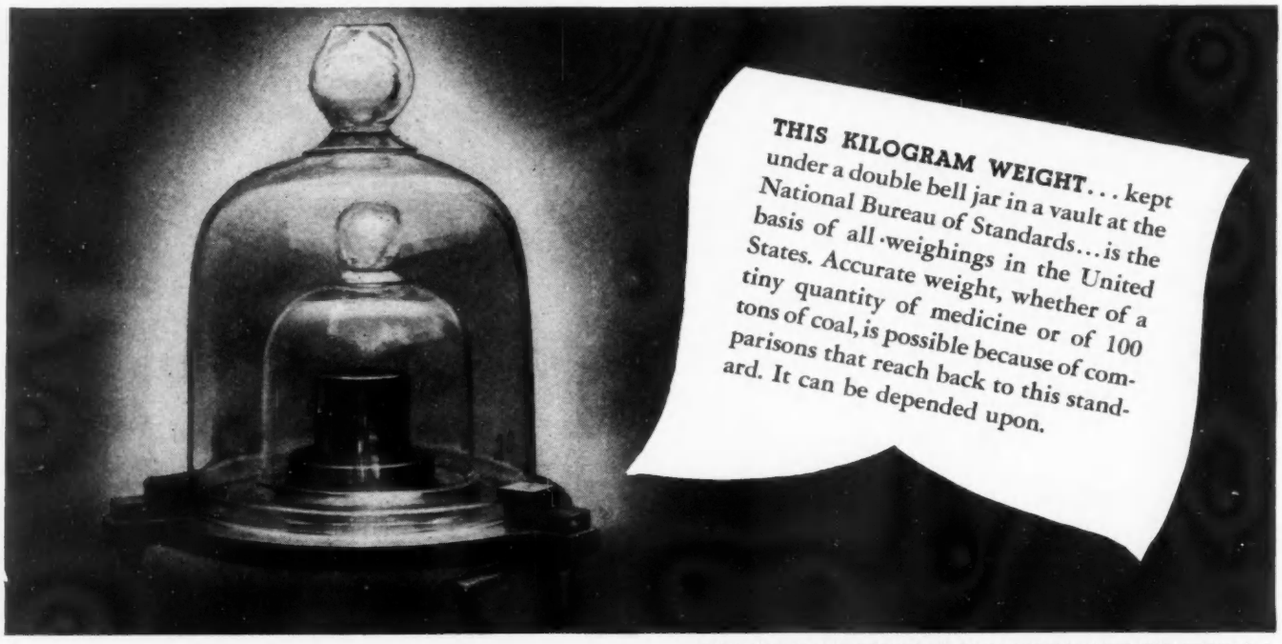
Stromberg-Carlson Tel. Mfg. Co., Factory, General Offices: 100 Carlson Rd., Rochester, N. Y.; Branch Offices: Chicago, Kansas City, San Francisco, Toronto

rg Carlson

APPARATUS FOR FORTY-EIGHT YEARS

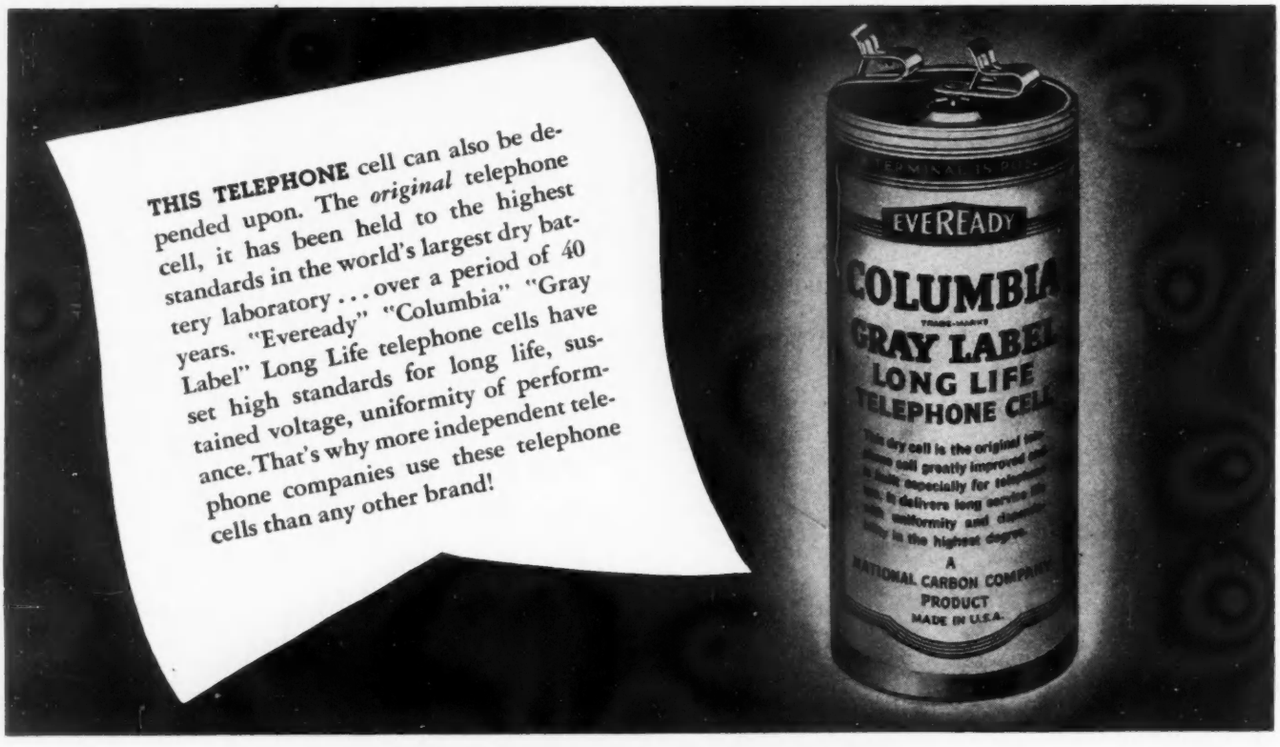
Number 11 in a series showing old methods of war communication

STANDARDS TO GO BY



THIS KILOGRAM WEIGHT... kept under a double bell jar in a vault at the National Bureau of Standards... is the basis of all weighings in the United States. Accurate weight, whether of a tiny quantity of medicine or of 100 tons of coal, is possible because of comparisons that reach back to this standard. It can be depended upon.

PHOTOGRAPH COURTESY NATIONAL BUREAU OF STANDARDS, WASHINGTON, D. C.



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LET'S GO! U.S.A. KEEP 'EM FLYING!

GO BY STANDARDS

Highlights of the Communications News

Important Communications developments of the past month, briefed for busy readers

by

ROLAND C. DAVIES
Editor, Telecommunications Reports

AS THE YEAR ENDS

THE FIRST year of the United States at war finds: 1. The Telephone Industry, like all other branches of American industry, had plunged wholeheartedly and with every resource into the tremendous task of providing the Nation and its Army and Navy with the greatest amount of telephone service ever before required. This was done with the handicaps of drastically cut supplies of the vital metals and materials, especially copper, that go into the building of the telephone plant, switchboards and facilities. But in every case of telephone service, required by the armed services and by war production industry and for civilian defense, the telephone industry—Bell System and Independents—has produced and come through "with flying colors."

2. The new program for manpower to end enlistments and to stop the drafting of men above 38 years of age will be of great assistance to the industry in gauging its manpower needs. Then, too, the industry will be undoubtedly classified as an "essential" war industry by the War Manpower Commission in its future planning for the shifting of men from non-essential civilian industries into war work.

3. The left-wing New Dealers now appear to be in their final acts on the Washington stage. The new Congress is deemed certain to curb the excesses of the left-wingers in their efforts to regiment and socialize business. But, of course, due to the requirements of the war there will be naturally a continuance of certain questionnaires and information demands from business because of the machinery of keeping industry completely geared to the war effort.

4. The telegraph merger legislation seemed most likely to die in the present session of Congress. While New Dealers may make a determined effort to have the telegraph companies placed under government control to force a consolidation, the new Congress, according to its leaders, can block that move by quick action on the legislation early in the new year.

Toll Rate Reduction

EVEN though burdened with the tremendous tasks of supplying telephone service for the war activities of the nation, now in its second year of the global conflict, and of using its curtailed facilities and manpower to the best possible efficacy, the telephone industry found itself during the month of December having to center its attention on the new regulatory effort of the Federal Communications Commission—its move to force a drastic reduction of long distance rates of the American Telephone and Telegraph Company's Long Lines Department on the alleged basis of excess earnings of between $47,000,000 and $62,000,000.

The assault of the FCC on the long distance rates was slated to be launched in hearings, beginning Dec. 16, before a three-member Commission committee, composed of Commissioner Paul A. Walker, chairman, and Commissioners Ray C. Wakefield and Clifford J. Durr, and a cooperating group of five state commissioners. How long a series of hearings will be staged could not be forecast as there were many imponderable factors which might arise. The FCC investigation might turn from a quest for a reduction of interstate toll rates into a study of increasing the present scale of toll compensation and divisions between the A. T. & T. Long Lines Department and the Associated Bell companies and Independent connecting companies originating and terminating the toll traffic. Another important aspect was that the leading officials of the War Production Board, Army and Navy were inclined to be critical of the effects of a rate reduction in stimulating long distance traffic on the already severely strained lines and network of the Long Lines system. These branches of the government were understood to feel that the stimulation of traffic from reduced rates would seriously injure the present priorities system for war effort and governmental long distance calls and would tend definitely to slow up the speed of long distance service. In addition, a drastic slashing of rates would injure the effects of the Bell System's advertising program urging the public not to use the long distance service for non-essential calls. This advertising program had been conducted by the Bell System at the request of the Board of War Communications and cost the System some seven millions of dollars.

Undoubtedly the FCC would be most happy to secure a reduction through informal closed negotiations just as it has in its perennial efforts in recent years—in 1936, 1937, 1939 and 1941. Even though the FCC in announcing the present investigation of the Long Lines rates opened the gate for negotiations through a pointed reference to the 1941 negotiated reduction of $14,000,000, the outlook at the press time of TELEPHONE ENGINEER FORTNIGHTLY was that the A. T. & T. was prepared to fight the investigation and proceeding. One hint came from FCC sources that a compromise might be reached in regard to the reduction of rates by a slashing of the rates for leased line service and for the network program service of the broadcasting industry when FCC Chairman James Lawrence Fly stressed these two services in a press confer-

ence in response to inquiries by newspapermen.

One of the main motives behind the FCC goal of a large toll rate reduction was thought to be its value in seeking an increased appropriation from Congress for its next fiscal year's funds. In each previous case of an A. T. & T. Long Lines rate slash, the FCC spokesmen for the Congressional Appropriations Committees have used the results of the rate reduction as trump cards for the securing of additional appropriations by showing how many millions of dollars the Commission has saved the public in lower telephone rates.

To carry out a speedy termination of its goal of reducing the Long Lines rates, the FCC has announced that it will order an interim rate reduction after it has concluded part of the investigation hearings. This move of an interim rate reduction was aimed, in addition, to shut off the efforts of the A. T. & T. to have the investigation extended over a considerable period of time by a separation of interstate and intrastate telephone revenues, expenses and property and by an inquiry into toll compensation and divisions.

FCC Denies Motion For Postponement

IN line with the aim of a speedy conclusion of the proceedings, the FCC denied the motion of the A.T.&T. Long Lines Department to have the hearings postponed from the Dec. 16 hearing date to a later time with April 1 of next year proposed for the commencement of the investigation. The denial of the A.T.&T. motion, which had been viewed as a foregone conclusion, came three days after it had been filed by the company jointly with its answer to the Commission's show cause order. The A.T.&T. was ordered by the FCC to commence its presentation of evidence which it had available and to present the Commission with a full statement in writing at the time of the hearing about the other evidence which it wished to offer and the time needed for its preparation. In its motion the A.T.&T. cited that the Commission should consider the question of the necessity for increased toll compensations and divisions with the originating telephone companies and the station-to-station and board-to-board bases of rate-making and the approved simplified method of separation and pointed out that the technical and legal staffs of the telephone companies were fully occupied with the problems of operating the telephone service under wartime conditions.

Convention Dates

Minnesota Telephone Association, Hotel Lowry, St. Paul, January 26, 27, 28.

Illinois Telephone Association, Hotel Knickerbocker, Chicago, April 20, 21.

Spring Executive Conference, United States Independent, Telephone Association, Edgewater Beach Hotel, Chicago, April 22 and 23.

The American Telephone and Telegraph Co. in its answer, filed Dec. 1, to the FCC's rate reduction show cause order threw down the gauntlet to the Commission in no uncertain terms—in the same keynote as was voiced by A.T.&T. President Walter S. Gifford in his statement at the time of the FCC's order that it did "not make sense" in terms of winning the war and would result in further straining of the burdened telephone plant, already curtailed by the shortages of materials and metals and of manpower.

The stimulation of traffic which would result from a drastic reduction of the long distance telephone toll rates would be contrary to the wartime principle of public interest and would be counter to the declared purpose of Congress for the most efficient communications system possible for the Nation when it created the FCC and enacted the 1934 Communications Act. This was the major keynote struck by the A.T.&T. in its answer.

Countering the FCC allegation of the Long Lines' excess earnings after Federal taxes of between $47,500,000 and $62,000,000, the A.T.&T. answer pointed to the Commission's failure to include all the Federal taxes. After citing the Long Lines was only a branch of Bell System and estimating the 9 months on an annual basis the answer brought out 1942 earnings will be lower than 1941 and that the Bell System gross revenues will have increased from $1,298,689,000 in 1941 to $1,439,094,000 in 1942 or a rise of 10.8% and Long Lines gross revenues increased from $129,480,000 in 1941 to $171,297,000 in 1942 or 32.3%. But net operating income after taxes for the Bell System declined from $229,212,000 in 1941 to $202,059,000 in 1942, a drop of 11.8% and for Long Lines Department had declined from $34,571,000 in 1941 to $31,753,000 in 1942 or a decrease of 8%.

If Long Lines is treated as a separate corporation paying its own taxes the 1942 net earnings for that Department, the answer brought out, would be reduced to $28,515,000. This latter figure was computed after deduction of the amount of the "post-war credit" provided under the 1942 Revenue Act and, had this deduction not been made, the A.T.&T. answer stated the earnings would have been further reduced to $23,661,000 which is a 6.97% rate of return on the FCC order's rate base.

The Bell System as a whole will earn in 1942 about 4% on its gross investment in plant devoted to communications service, the A.T.&T. answer emphasized, and 5.4% on such gross investment in plant less the entire depreciation reserve with minimum allowance for working capital.

FCC Order Should Take In Consideration Joint Through Rates

POINTING out that the FCC order conflicts with the law in not requiring a consideration of the expenses and property connected with the joint through long distance service in the rate investigation, the A.T.&T. declared that this should necessitate a separation of the expenses and property of the companies participating in these joint through services. "The time provided in the order to show cause for answer and hearing is too short to permit any showing whatsoever" by the A.T.&T. as to these matters, the answer stated.

None of the participants in the joint rates are made respondents to the order to show cause except the American Telephone and Telegraph Co., the answer emphasized. All such participants are necessary parties to a proceeding, the answer added, to determine the reasonableness of such joint rates and without such parties an order requiring a reduction in such joint rates would be unlawful and void. The A.T.&T. pointed out that the FCC already has pending before it an investigation into the station-to-station and board-to-board bases of rate making and the expenses incident to the furnishing of interstate toll service cannot be determined until it is determined how much service is covered by these rates. While if the Commission keeps undetermined the decision of what service is covered by such rates this would constitute a denial of due process of law.

A.T.&T. Answers

The A.T.&T. answer specifically denied: that the existing rates for communications services, furnished wholly or in part by the Long Lines Depart-

(Please turn to page 55)

Wire Chiefs TRAINING COURSE

Underground Conduit Plant

Sec. XXI

(Prepared Expressly for TELEPHONE ENGINEER by the Lincoln Engineering School)

General

THE term "underground conduit system" refers to one or more underground ducts into which telephone cables can be placed and removed. An underground conduit system may consist merely of a single run of conduit from the central office pole into the basement of the telephone building and serving as an underground entrance for the main aerial feeder cables, or in the larger plants it will consist of an extensive arrangement of ducts and manholes to provide for complete underground cable distribution in the more congested parts of a city.

Underground conduit plant is expensive in first cost but has long life and offers maximum protection to the cable plant. An underground conduit system must be carefully planned well in advance of construction, and unlike aerial open wire or cable plant should never be constructed on a hand to mouth basis.

The number of ducts, type of duct materials, routing, and possible conflicts with other underground structures should be carefully considered and accurate maps prepared for the construction forces before work is started.

Field of Use

UNDERGROUND conduit is generally required where the number of circuits to be carried along a given route is too great for aerial construction, or where civic pride or other consideration dictates that telephone plant be placed underground. In general, whenever more than 1200 pairs must be carried along a given route it has been customary to use underground conduit. The annual charges on underground cable will run as low as 8% as compared to 18% for aerial cable. In practically all towns from 10,000 population up it will be necessary to have an underground conduit system radiating from the central office for at least several blocks in each direction.

In the smaller exchanges it is now considered good practice to carry the feeder cables into the office via underground ducts. The ideal arrangement is to have the ducts terminate in the basement of the telephone office preferably at a point beneath the main frame. The tip cables from the main frame can then be carried down through the floor and spliced in a "cable vault" below the frame. If the space beneath the main frame is not accessible or suitable for this purpose then a small manhole located close to the building wall makes a convenient meeting place for the aerial paper insulated cables and the textile insulated tip cables which are carried by means of conduit from the frame directly to the manhole.

Design Features of U.G. Conduit Systems

THE first consideration in designing an underground conduit system is to determine the number of ducts and their routing. The route selected should be one which offers the most direct feed to the areas served by the conduit. If because of paving and other considerations the most direct route would be substantially more costly than some alternate route then the two routes should be carefully compared as to all involved costs and other deciding factors and a selection made.

The determination of the number of ducts to be placed must take into account not only the present but also the future requirements. For the smaller exchanges it is in almost all cases

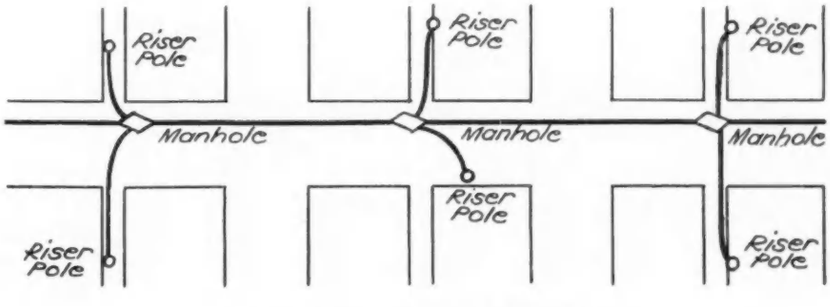

Fig. 1—Underground Conduit Route Map

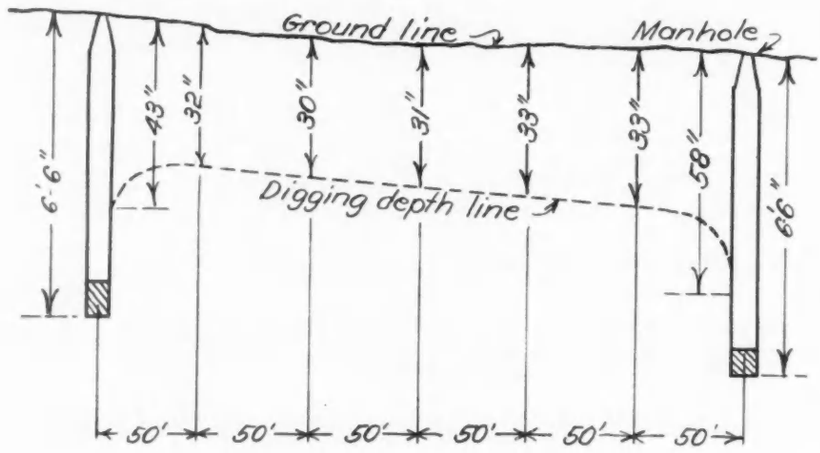

Fig. 2—Profile Map for U.G. Conduit Construction

feasible to place the ultimate duct requirements initially rather than plan on reinforcement of a smaller initial conduit system at some future time.

A conduit system may be considered as consisting of three elements, viz. (1) main duct runs (2) lateral or branch duct runs, and (3) manholes and handholes.

The main duct run consists of one or more ducts extending out from the office and intercepted by manholes at periodic intervals along the run. The branch or laterals are one and two duct runs extending from manholes to aerial cable riser poles, or to buildings. These laterals may terminate either on an outside wall of the building, or in the basement.

The location of manholes is determined basically by the maximum length of pull for various size cables, and in general it is customary to keep the maximum length of pull between manholes to 700 feet or less. It is of course feasible to have manholes much further apart where it is definitely known that it will never be necessary to pull in a large size cable.

Duct Construction

THE most common type of duct material is **vitrified tile.** In the simplest type of conduit system ordinary 4-inch sewer tile is used as it is both cheap and commonly available. The larger duct systems make use of **vitrified multiple tile duct.** This type of duct comes in 24 inch lengths and in various combinations and shapes containing 2, 3, 4, 6, etc. ducts. It offers the advantage of a compact, strong, duct system where several ducts are required in the run. It requires more skill to lay than does sewer tile and certain other types of duct material but when properly laid results in a long life and a very reliable duct system.

Tubular duct consisting of either a black fibre, or transite (cement-asbestos) pipe in ten foot lengths is also very popular and somewhat easier to lay than multiple tile duct. When this type of duct is used it is generally encased in a concrete envelope. Transite duct has greater strength than fibre and is often used without the concrete envelope particularly where it is located in parkways or along road sides which do not carry heavy road traffic.

Creosoted **wood pump log** is also used to some extent for duct systems. It has the advantage of having sufficient strength that it can be layed directly in the ground without the necessity of a protective cement envelope.

For special construction as for example where it is necessary to change the relative position of the ducts in a trench there is available **mitered and transposition** multiple tile duct. By means of this special conduit a vertical tier of ducts can be fanned out to a horizontal position as for example at a point where it is impossible to get by some obstruction. Transposition duct accomplishes about the same thing as mitered conduit but in a somewhat different manner. This conduit consists of duct which has been given a twist so that by using several sections the position of the ducts can be changed from horizontal to vertical or if necessary turned through a complete 180 degrees.

Route and Profile Maps

AS previously mentioned one of the first steps in laying out a conduit system is to select the route and number of ducts to be placed. The **route map** need not be elaborate and should show schematically the location of the run with respect to curb or sidewalks, the distance between manholes, location of manholes, lateral runs, and the location of all other underground structures which may be in close proximity to the proposed duct run. Figure 1 illustrates a typical map of this type.

After the route map is completed a **profile map** should be prepared to show the contour of the ground along the route selected and the digging depths to give both proper coverage and drainage. The necessary data for the profile map must be obtained by measuring ground elevations between manholes. This is not a difficult job and can be accomplished with an ordinary Keuffel and Esser hand level, or to insure against possible error it is somewhat safer to use a regular surveyors level. Elevations are taken at 50 foot intervals along the route of the run and with this data a map as shown in Figure 2 can be prepared and the digging depths worked out. The depth to which ducts should be placed will depend largely upon the nature of the traffic (if any) above the ducts. Where located under roadways which carry heavy traffic they should be placed at a minimum fill of 24 inches between top of conduit and surface of the street.

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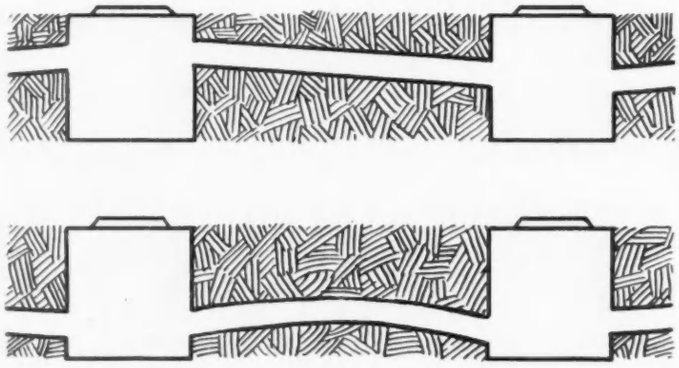


Fig. 3—Grading Between Manholes.

Effect of WAR EFFORT on Plant Design

By
RAY W. SMITH, Editor

Effect of Critical Material Situation on Plant Design

THE present scarcity of steel and copper is resulting in some new trends in plant design. Naturally these run to the saving of critical material either by a change in the gauge or type of a plant element, or by a reduction in service standards, or by both.

Typical of this trend is the recent introduction and extensive use of 28 ga. cable. This size is now manufactured in almost all standard sizes and requires only 62.8% as much copper as 26 gauge, 39.4% as much as 24 gauge, and 24.8% as much as 22 gauge. From this it can be seen that real economies in both copper and lead are possible by the use of 28 gauge. The transmission loss is of course higher and because of its high resistance (approximately 700 ohms per mile) long lengths of 28 gauge are often not feasible because of supervision limitations rather than transmission. For relatively short branch cables, it can generally be proven in and in many cases it can be used for an entire distribution plant in a military and defense project with a resultant saving of thousands of pounds of copper and lead.

Information as to possible splicing difficulties is not yet available but it is doubtful that any serious problems will develop. Splicers will need to adapt themselves to the handling of the much smaller conductors and may not welcome the change.

Telephone companies are being asked by WPB to use smaller gauge steel wire than normal where transmission and storm loading factors will permit. This consists in the use of .083 wire in place of .109. This results in a saving of approximately 71 pounds of steel per mile of wire. Smaller gauge hard drawn copper line wire is also being used.

Restrictions on Use of Weatherproof Telephones

ANOTHER example of how plant design is being influenced by preference rating applications is the WPB recommendations for the use of ordinary wall sets (of which there is an ample supply already manufactured) housed in "homemade" wooden weatherproof boxes for use as guard and fire reporting stations in military and defense projects. The standard weatherproof telephones that are ordinarily used for this purpose consume substantial quantities of critical materials, and it would seem that these telephones could not readily be absorbed into ordinary telephone channels after the war. Considering the number of military and defense projects requiring phones of this type it would seem that this is a logical step in the conservation program, even though the makeshift weatherproof telephones may not be as convenient or trouble free as the specially designed outdoor type telephones.

Cable Fills—Use of Extension Stations

WHEREAS this time last year proposed cable systems for defense plants were being designed on the basis of initial minimum fills of 70% this has been increased to 80% and

Secretary "Bob" Hedrick of the Missouri Telephone Association greets Kellogg's Ray Krueger (center) and Leich Sale's Dick Faulhaber at the recent Missouri convention at Kansas City.

many cable systems are being engineered with even higher fills.

The greater use of bridged stations to take care of growth in personnel on existing PBX installations and to save both cable pairs and central office equipment on a new installation is a definite trend. It would seem to this writer that the real yardstick that should be applied to any consideration of bridged stations vs. individual line stations, would be whether or not the personnel using these telephone would be substantially slowed down to the point that might have a harmful effect on the war effort. Convenience to the user should come secondary to the war effort. The greater use of bridged stations should be based on the judicious selection of the stations to be bridged together rather than the establishment of a hard and fast rule that every PBX line should serve a minimum of two or three stations.

War Time Engineering

AT the recent industry advisory meeting the thought was developed that telephone companies must exercise greater influence over PBX customer's stated requirements in order to fix them at absolute minimums. Whereas in the past telephone companies have always done an excellent job of determining by commercial analysis the customers telephonic needs and then supplying equipment adequate to meet these needs, it is now suggested that they do an equally good job in making every effort to keep telephone requirements to an absolute minimum and that all possible expedients be recommended which will cut down the equipment requirements without seriously hampering the customers operations. It was pointed out that although the short engineering term prescribed by WPB orders results in low minimum requirements, that this does not prevent a PBX customer from asking and getting facilities that may be very generous compared to what they could satisfactorily get along with if all non-essential usage of telephones were taken out of the picture and, if the need for lines and stations is based on the complete essentiality of each users service requirements rather than convenience or personal rank in an organization. Some of the factors which were pointed out as helpful in assuring that PBX installations for defense and military establishments were engineering to barest minimums, were:

1.—Greater use of bridged telephones.

2.—Acceptance of somewhat slower service standards.

3.—Traffic analysis to determine if elimination of personal and non-essential business calls would relieve overloaded equipment and save necessity for additional units.

4.—Studies looking to the reduction of trunk holding time by a more expeditious conversational procedure.

Telephone companies have for some time recognized the need for educating the public to use the telephone less and to use it more efficiently. This is shown by the thousands of dollars that has been spent on advertising war time "telephone tips". Some companies are carrying an educational campaign directly to PBX customers and are furnishing instructional material which the customer can pass on to employees and having as its objective the heavy traffic overload now being experienced on many PBX boards and which if not corrected would necessitate additional equipment.

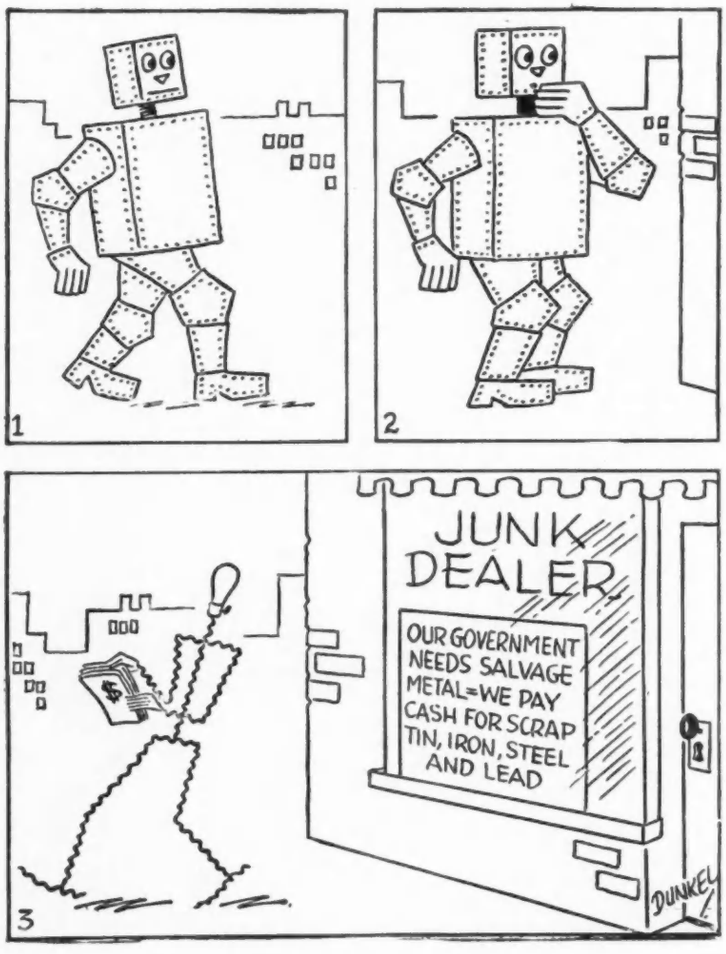
— END —

Nebraska Farmers Miss Their Telephones

In an editorial carried in the Lincoln (Nebr.) Star attention is called to the hardships farmers in the western part of the state are having because of their lack of telephones. To comply with the "share-the-load" program necessitated by the tire and gas situation the farmers are finding that their lack of foresight in having a telephone results in their using as much rubber and gas in getting share-loads as they would during peace times with the result that nothing, including time, is saved.

Communications Conference To Be Held in Australia

A communications conference of the British Empire commonwealths is to be held at Canberra, the Australian capital, early in December with Sir Campbell Stuart, chairman of the Imperial Communications Advisory Committee, as the conference's chairman. United States Minister to Australia, Nelson Johnson, is to follow for this country the developments of the parley which is being attended by government communications officials. Rates and expansion of service are the major topics on the program.



Thumb Nail Discussions

Construction Loss

By JAY G. MITCHELL

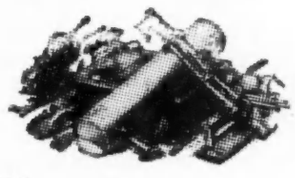
THE total cost of any physical property is determinable only when every element which gives rise to costs assumed by the builder is included in the total cost of the complete project. In the appraising of Public Utility properties this fact has been universally recognized from the earliest times. It is equally true whether the appraisal is intended to develop Original Cost, Historical Reproduction Cost or Reproduction Cost New.

The assembly of an inventory in which are listed all of the elements of the physical plant, although a tedious and exacting process, is simple in principle and involves no particular difficulties. The appraisal of such an inventory, however, throws into bold relief those factors which enter into the total cost of the plant, but which are not directly represented in the list of plant units or other items in the inventory. In the case of Public Utilities any appraisal of property must be so formulated as to permit of the closest check and verification by regulatory authorities. In addition, effective management calls for the most accurate allocation of all construction costs. Among other requirements of management which insistently demand the accurate allocation of costs, the Public Utility field especially must maintain an accurate basis for accounting for plant retirements. In a system in which the plant retirement costs of a public utility, for illustration, inadequately reflect the cost of the plant units with which they are associated, the fixed capital accounts will be progressively overstated and where the retirement units represent an inflated retirement cost, the plant accounts will be progressively understated.

Space will not permit of a discussion here of all of the elements of cost which must be developed, in addition to the items listed in the carefully made inventory, in order that an appraisal may adequately represent, on any basis, the cost of the completed physical property.

One of the important elements of the total cost of any physical plant which is not represented in any way in an inventory of the plant has been conventionally named Construction Loss. About the close of the World War I many appraisals were made in which this item, together with other similar elements of the total cost, was included by means of flat allowances related by per cents to the cost units or the appraisal totals as the case might be. In many cases this rather clumsy method, because of the integrity and wide experience of the makers of the appraisals, produced a total which was surprisingly accurate in the aggregate. It is obvious, however, that the allocation of cost to the various elements of the plant in such cases could be universally correct only through the barest coincidence. This inaccuracy in the allocation of cost to the several elements of the plant resulted in the use of an individual factor separately developed for each item of the inventory, which factor was designated by the originator "Damage, Loss, and Shrinkage." It was, obviously, a part of the **material** component of the cost units used in making appraisals and could have no relation whatsoever to the labor component of the cost units. This is mentioned because some of the crude methods which have been mentioned and which depended upon the principle of applying flat per cents to the total cost units for this and similar items in reality loaded not only the material part of the cost but also the labor component with an allowance for Damage, Loss, and Shrinkage. While the final result attained by such methods was often substantially correct in the aggregate total it was, obviously, open to effective attack because the cost of material represented by Damage, Loss, and Shrinkage had no relation whatsoever to labor costs. The same criticism exactly is one that was developed to attack the allowance on the basis of the per cent of the total cost, including labor, for warehouse expenses.

Half of every tank, gun and ship is made from scrap iron and steel



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The basis on which an allowance of cost to cover Construction Loss may be added to the material is due to the following indisputible facts. In any physical plant the amount of material embodied in the finished project is certain to be less than the amount of material purchased and allocated to the plant. A simple illustration of this fact may be found in the poles of an accurate inventory of a given telephone plant when compared with the number of

poles definitely purchased for and allocated to the plant. Between the time at which the poles are shipped and the time at which they appear in place in the finished plant losses are bound to occur due to theft, breakage, fire and other causes. It is likely that in the case of a plant account which shows, according to an accurately made inventory, 1000 telephone poles in place that this number of poles in reality represents purchases of 1010 poles by the company. Because the purchase of poles in such a case resulted in only 1000 identifiable poles in the finished plant, it is obvious that the material cost of the poles in the inventory must be increased by 1 per cent in order to develop the actual cost of the finished plant. In a similar way the number of miles of aerial wire disclosed by an accurately made inventory of a given telephone plant will not adequately set forth the number of miles of wire which must have been purchased in order to produce the amount found in the finished plant. Short ends discarded, coils lost, part coils discarded or stolen, and similar conditions account for the difference. It is obvious that every completed telephone plant, even if an inventory of 100 per cent accuracy were possible, cannot disclose as much material as had been bought and paid for by the builders. It is also obvious that the ratio between the finished plant and the material provided is not the same in the different elements of the plant. This means, for illustration, that the per cent of inventoriable material in the pole lines that may properly be applied to cover Construction Loss is not the same per cent of inventoriable material as may be properly applied to underground cable to cover the element of Construction Loss.

Inventory methods must also be taken into consideration when fixing the per cent to be used to determine Construction Loss. This may be illustrated very clearly by the Construction Loss per cent properly to be added to the material component of underground Cable cost units. When the cable is inventoried on the basis of the number of feet of finished cable in place, the actual loss of cable because of splicing may be included as an element of the material cost of cable splices or may be omitted entirely from the cost units of the cable splices and included in the Construction Loss applicable to the finished cable. The reasons why it is sometimes advisable to include the loss in cable length due to splicing as part of the splicing cost units and in other cases to include this loss of cable as an element of the Construction Loss applicable to the material component of the cost units for cable are too involved to discuss at this time. It is obvious, however, that prior to computing any per cent to be applied to the material in order to develop a Construction Loss allowance for underground cable, that such a decision must be made and must be faithfully adhered to thereafter.

For illustration, the per cents used in a recent appraisal for Construction Loss are listed below:

CONDUIT
- Main ..... 2 per cent
- Lateral ..... 4 per cent
- Manholes ..... 1 per cent

STATION INSTALLATIONS ..... 3 per cent

EXCHANGE POLE LINES ..... 1 per cent

EXCHANGE AERIAL CABLE
- Cable ..... .05 per cent
- Suspension .....2.5 per cent

EXCHANGE AERIAL WIRE
- Wire .....2.5 per cent
- Drops .....3. per cent

EXCHANGE UNDERGROUND CABLE
- Main ..... .07 per cent
- Subsidiary ..... 5 per cent

— END —

Communications Men Are Heroes On Guadalcanal

(This story, written by Sergeant James W. Hurlbut, former WJSV (Washington) publicity director who is a Marine Corps Combat Correspondent at Guadalcanal, was released by the Navy Department Nov. 20.)

GUADALCANAL, October 28 (delayed)—Marine riflemen on Guadalcanal are giving the communications men a big hand for their heroic work in installing and maintaining interunit communications systems here.

"Those Marines in signal are all right," their comrades assert. "They're really doing a job. You ought to see 'em running a line in under fire. Why, they don't give a damn for Jap snipers."

And that's about the case. The communications personnel "don't give a damn" for all the dangers inherent in the task of stringing a telephone wire up to a front line position during a battle or carrying a portable radio transmitter within shouting distance of the enemy.

The huge telephone spiderweb on Guadalcanal is made up of well over a thousand miles of wire. Just getting the wire laid in the first place was a tough problem. Keeping it intact in bombings, shellings, and adverse weather is a twenty-four hour proposition for all hands.

There's no diplomatic immunity for Marine communications men. A lineman, clinging to the side of a palm tree with spurs and belt, with both hands occupied in splicing a wire, is fair game for enemy snipers. Wire repair crews are made up of four men—three stand guard while the other works—but they've suffered many casualties since August seventh in the line of duty.

Recently, a wire repair crew was caught in the open during a surprise air raid. The man "on the pole" had the whole top of the tree chopped off a few feet above his head by a flying bomb fragment and the men on the ground were peppered with shrapnel.

The boys do their share of fighting, too! A platoon of communicators led by Captain Robert Noonan of Medford, Mass., found themselves face-to-face with a strong enemy force during a Japanese attack last month. Wire and radio equipment was hastily put aside and a firing line established. When reinforcements arrived to finish the job of throwing back the enemy, Captain Noonan had to do some tall persuading to get his men out of the fight and back to work.

On Guadalcanal, a switchboard operator has no soft touch. Private First Class Jim Roberts, of Tiptonville, Tenn., on duty during an air raid, had a switch cord severed between his hand and the board as he plugged in a call. Mildly astonished, he completed the circuit through another route and then rounded up the piece of shrapnel to carry as a good luck charm. Tiptonville friends will be glad to know it's still effective.

Chief of the communicators in the Guadalcanal-Tulagi area is hard-working Lieutenant Colonel Edward W. Snedeker, of Benkelman, Nebraska, and Greenville, North Carolina. Assisting in the task of coordinating the work of all the communications personnel is black-bearded Captain Robert Hall, of Detroit.

Largest single unit in the communications set-up is the Signal Company, commanded by Major Allan Sutter of Germantown, Pa. Major Sutter, a former Dartmouth athlete, was aide to General A. A. Vandergrift during the early stages of the occupation of the Solomons.

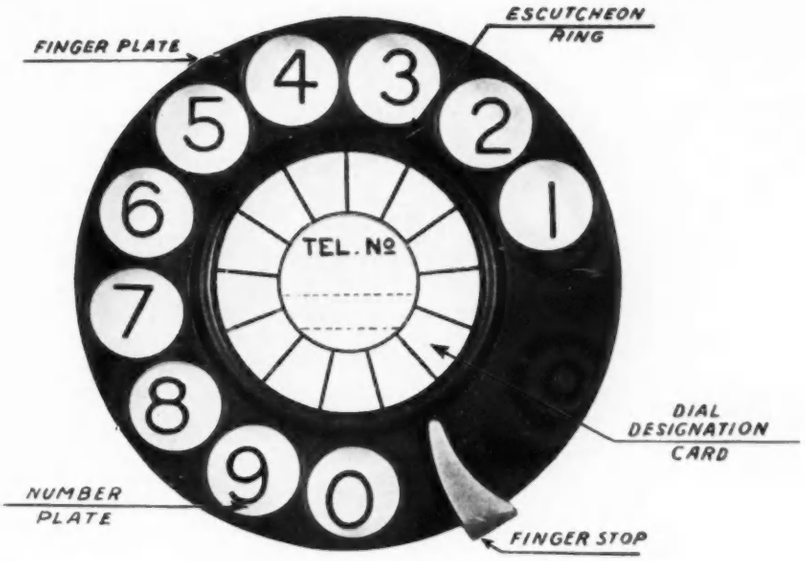


Fig. 1 (a) Front view of a No. 24 type dial.

New Type Dial Tester

by
J. S. REED, JR.

WITH an increasing number of community automatic exchanges replacing magneto exchanges throughout the country, many independent companies are confronted with dial maintenance in addition to field routine maintenance of subsets.

Some skill is necessary to properly adjust the mechanism of a telephone dial. Although the modern dial is rugged in construction and capable of thousands of hours of operation without failure, like any kind of mechanism, it needs occasional cleaning and lubrication of its moving parts and careful adjustment of the impulsing mechanism. For this reason, all mounted and unmounted dials should be reconditioned and carefully adjusted before being returned to service. This is a worthwhile practice, since the service life of the dial is greatly extended by such care.

This article discusses methods of adjusting dial speed and impulse ratio and describes a new type of testing instrument that greatly aids in making these adjustments.

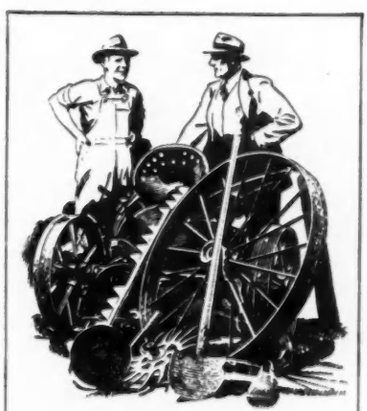
Function of the Dial

THE primary function of the dial is to generate successive trains of electric impulses under the control of the subscriber. These impulses operate a sequence of automatic switches in the control office to establish a desired connection between two subscribers. The generation of impulses is accomplished by interrupting the battery flow to the subscriber's telephone at a certain rate and in such a manner as to produce the correct form of the impulses.

Mechanism of the Dial

THE mechanism of the dial is shown in Figure 1 (a) and (b) which illustrates the front and rear views of an Automatic Electric Company Type 24 dial.

Essentially the dial consists of a finger plate for operating the dial, a ratchet gear and pawl assembly driven by a main spring wound by the rotation of the finger plate, and an impulsing cam mounted upon a shaft controlled by a governor driven through a special laminated gear on the pinion shaft. The relagear on the governor shaft. The relation of the various parts is illustrated by a cross-section view of the dial shown in Figure 2.



"What's it good for?"
"Guns, tanks, and maybe part of a plane"
V-1664

The governor rotates at a speed of 5400 r.p.m. A pair of fly balls each mounted on the end of a flat spring (wing) attached to the governor shaft rotate within a smooth metal cup. Centrifugal force causes the balls to fly out and rub on the inside of the cup. The resulting friction slows the rotation of the impulse cam to a certain speed that will result in the desired impulsing rate of 10 impulse per second within very close limits.

The opening and closing of the dial circuit is accomplished by means of a pair of springs operated by a cam on the pinion shaft. The cam contour is so proportioned that the springs are normally opened 61½ per cent and closed 38½ per cent of the time during each impulse.

Impulse Ratio of the Dial

IMPULSE RATIO is defined as the ratio of the closed interval to the sum of the open and closed intervals of an impulse, expressed as a percentage.

Laboratory experiments conducted by the Automatic Electric Company have shown that the optimum ratio is 38½ per cent closed contact. This optimum impulse ratio is illustrated in Figure 3.

Next to the correct frequency of the dial impulses, the proper impulse ratio is very important. This is because relay operation in switching mechanisms is markedly affected by the nature of the impulses generated at the subscriber's telephone. The loop resistance and the leakage of the line, the kind and number of subsets on the line, and the inductive properties of the relays themselves all influence the shape and spacing of the impulses, making the closed intervals a little longer and the open intervals a little shorter, and in general distorting the wave form of the impulses.

In the Strowger switching mechanism, the line relay repeats the impulses from the dial through its back contact to the switching magnets; that is, the line relay is operated during the closed intervals of the impulses and the switching magnets during the open intervals of the impulses. The switching magnets require considerable electric power to drive the contact wipers, and therefore the open intervals of the dial impulses should be kept as nearly as possible at their optimum length so as to result in the maximum current being delivered to the switching magnets during each impulse. On the other hand, line and subset capacitances cause a shortening of the open intervals by increasing the length of the closed intervals. This effect is difficult to avoid, and switching efficiency may be further impaired if the dial impulse springs are not adjusted to produce the optimum impulse ratio of 38½ per cent closed circuit.

Dial Speed and Impulse Ratio Indicator

SINCE the satisfactory operation of automatic switches is dependent to a considerable extent upon the correct **dial speed** and **impulse ratio,** a reliable indicator is needed to accurately test these characteristics. In the past, it was a simple matter to test the impulse ratio by means of an ordinary voltmeter in series with the current source and the impulsing springs, the voltmeter being calibrated by means of a standard dial to show the correct impulse ratio on a suitable scale. Dial speed is normally checked by means of a mechanically indicator consisting essentially of a spring operated pendulum and escapement mechanism and associated with a relay driven mechanism operated by a train of ten impulses from the dial under test to indicate the impulsing speed.

New Type Dial Speed Indicator

THE Automatic Electric Company have recently developed an electric type

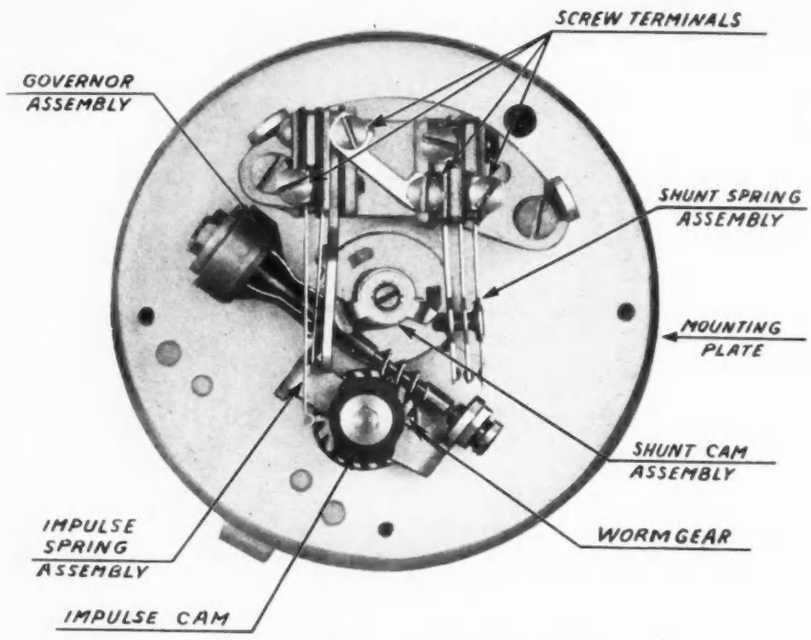


Fig. 1 (b)—Rear view of No. 24 type dial.

of indicator, for testing both impulsing speed and impulse ratio. This instrument operates upon a very simple principle. Referring to Figure 4 which shows the circuit diagram of the indicator, dial impulses are repeated by the 500 ohm relay into a high capacity circuit in series with the impulse indicating meter and the current source. Two condensers are so connected to the front and back contacts of the relay that each alternate condenser is charged and discharged with each impulse operating the relay. The condensers charge through the meter in series with them and discharge through the 100 ohm resistor. The charging current thus flows through the meter twice for every impulse of the dial. The values of the meter resistances and of the condensers have been so selected that by using a scale of 0 to 15 impulses per second on an 0-1.5 milliammeter, the meter will indicate the impulsing speed with good accuracy.

Calibration of the Dial Speed Indicator

THE **dial speed indicator** is calibrated by means of a "standard" dial having a speed of exactly 10 impulses per second and the correct impulse ratio. The standard dial is connected to the pulse terminals of the indicator and potentiometer "P" is adjusted until 10 impulses per second are consistently registered on the scale upon operating the dial. Slight variations of the battery potential will not noticeably affect the accuracy of the readings and the indicator will hold its calibration indefinitely; provided the potentiometer adjustment is not disturbed or the battery potential allowed to vary to a considerable degree. The calibration can be easily checked at regular intervals with the standard dial.

Impulse Ratio Indicator

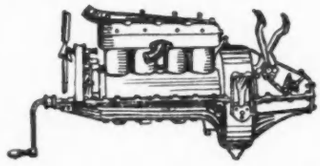
THE indicator circuit also provides for the testing of the impulse ratio of dials. A rheostat "R" in series with the meter and battery is adjusted to indicate 100 per cent closed circuit with the pulse terminals shorted. On operating a dial connected to the terminals, the meter will read the percentage of make contact (closed circuit intervals). The per cent-make-contact scale (0-100) is obtained by so selecting the meter constants—shunt and series resistances—so as to result in an artificial lag of the meter needle closely corresponding to the per cent make contact of the dial interrupter springs.

The calibration of the impulse ratio indicator is checked by means of the standard dial. The meter should register approximately 38½ per cent make contact. The exact point on the scale should be conspicuously marked to facilitate rapid testing of dials.

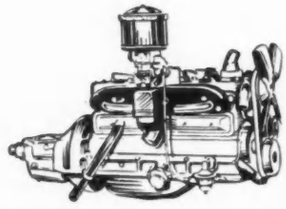
It is important that parts of good quality be used in the construction of the indicator. A good quality meter with a large, open face and having an 0-1.5 milliampere movement should be used. The 15 ohm shunt and 10 ohm series resistances should be correct to within 1 per cent of their rated values. The 5-MF condensers must not vary from their rated capacity by more than 10 per cent, and each must not differ from the other by more than 2 per cent, plus or minus.

(Turn page please)

LOOK AT IT THIS WAY

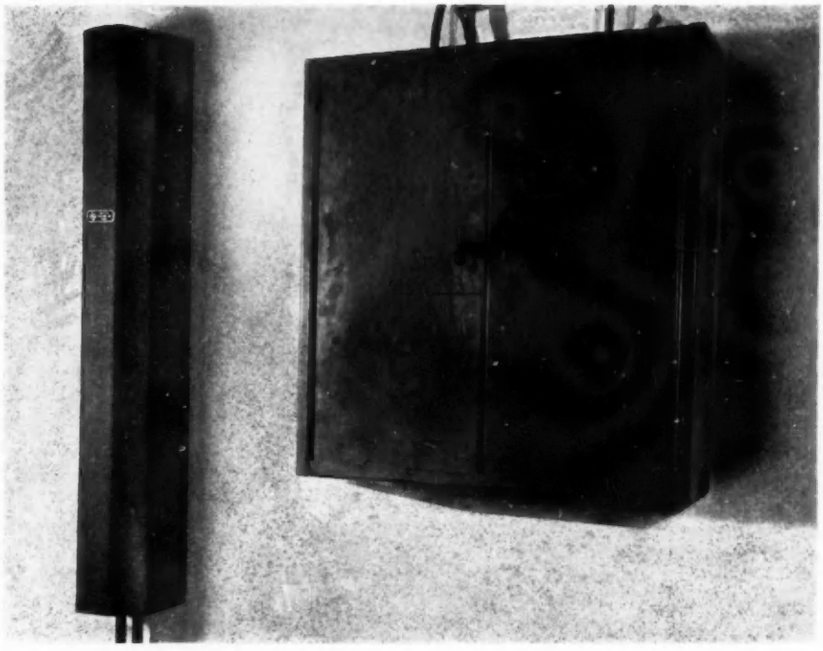


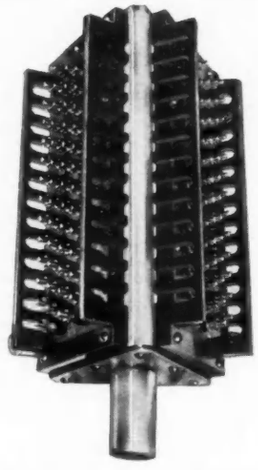
Automobile engines of the 1920's burned more fuel, generated less power and speed and were inaccessible for working.



Today's streamlined automobile engines give greater performance at less cost for fuel and are designed for space saving and easy accessibility when service is required.

. . . *and* IT'S THAT WAY WITH THE NEW COOK TERMINAL VAULT . . . *too!*





Uniflex Cable Terminals housed in the new Terminal Vault are of triangular design for greater interior space for cable forming and connecting. Bakelite face plates, fitted with non-corrosive studs, are clamped and gasket sealed on one or more sides of chamber when required for 52 pairs in pole, wall or cabinet mounting. Can accommodate three plates of 78 pairs for pedestal mounting. Face plates have one piece moulded fanning strips with white numbering strips for identification markings. Bottom plate accommodates two or more self-soldering nozzles. Each unit only 12½" high. Scores of other new features. Write for complete details.

THE NEW VAULT

The new Cook Terminal Vault takes only one-third the space of locker type cabinets and provides 100% working accessibility to the Uniflex Cable Terminals which it houses. Cover section is completely removable and wall mounting back section has no projecting sides to limit working space. No doors, latches, hinges, etc., to limit working space. And its cost is less than half that of ordinary terminal units! Streamlined appearance, durably finished one piece welded cover section, concealed lock, insulating individual drop knockouts, close fitting dust proof cable entrances.

THE OLD CABINET

This cabinet houses the same capacity Uniflex Cable Terminals as the Terminal Vault. The cabinet requires 4.32 cu. ft. of wall space and the Vault requires only 1.35 cu. ft. Doors, latches, hinges and the projecting sides of the cabinet reduce working accessibility and slow up installation and other work. Fewer man hours for installation or service and extension are required and better protection of the apparatus is offered when the new Terminal Vault is used.

COOK ELECTRIC COMPANY
2700 SOUTHPORT AVENUE • CHICAGO

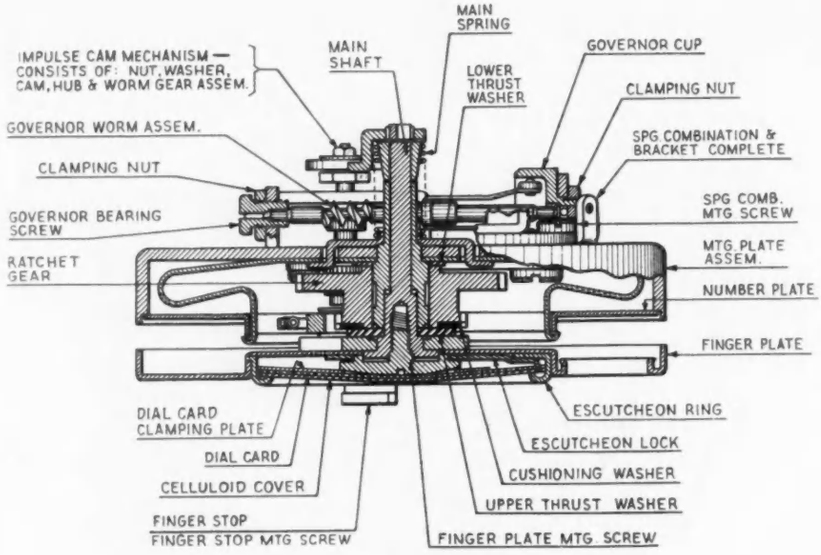


Fig. 2—Cross-section view of No. 24 type dial.

Operation of the Dial Testing Equipment

TO test the impulsing speed of a dial, connect the dial interrupter springs to the pulse terminals of the indicator, operate the indicator key to the dial speed position and dial "0". The meter will then register the impulsing speed of the dial on the dial speed scale.

The speed of the dial is regulated by bending the governor wing tips in or out as required by means of small pliers or a spring bending tool. This is a rather delicate operation and some skill is required to obtain the desired dial speed with the fewest possible adjustments of the governor.

Factory specifications for the Automatic Electric Company's dial permit a variation of 8 to 12 impulses per second. However, in the case of dials repaired in the shop, it is a simple matter to adjust the dial speed to within 9½ to 10½ impulses per second with the aid of the new type of speed indicator.

To test the impulse ratio, set the indicator key at the impulse ratio position, operate the calibrating key a,nd set rheostat "R" to register full scale on the meter. Then dial "0". The meter will register the percentage of make contact of the dial on the impulse ratio scale. If the impulse ratio is not correct, adjust the dial interrupter springs for greater or less tension by bending the heavy stop spring at the spring assembly, also the outer spring operated by the impulsé cam.

Adjustment Specification for Dials

TO attain proficiency in adjusting dial interrupter and shunt springs, the manufacturer's instructions should be carefully followed. The following excerpts are taken from the Automatic Electric Company's Standard Adjustment for Type 24 Dial, No. A-805.

Impulse Spring:

"WHEN not engaged by the impulse shortening arm, the middle impulse spring shall rest firmly against the heavy stop spring from its own tension.

"With the finger plate off normal and the tip of the main impulse spring opposite a low side of the cam, the main impulse spring shall rest against the contact of the middle spring with minimum 25 grams, maximum 50 grams contact pressure.

"With the finger plate off normal and the tip of the main impulse spring opposite a low side of the cam, the heavy stop spring shall hold the middle and main impulse springs so as to make the separation between the main impulse spring and a low side of the impulse cam approximately the same as the space between the contacts when the main impulse spring is resting against the high side of the cam."

Main Spring and Shunt Springs

"THE main spring shall have one to one and a third turns tension with the dial at normal.

"The impulse shortening arm, when used, shall cause the main impulse spring to clear the cam by minimum .015", maximum .030" during the shorted impulse.

"The impulse shorting arm shall not cause the impulse springs to move until after the completion of the last pulse sent out.

"Shunt springs shall be tensioned so that as the dial returns to normal or moves off normal, each spring will make contact with its adjacent spring while traveling through a space of not less than .015".

"Contact separation for shunt springs either in their operated or normal position shall be from .015" to .030"."

Governor:

"THERE shall be perceptable end play in the governor but this end play shall not exceed 1/64".

"The governor wings shall be formed as nearly as possible alike.

"The dial shall operate at a speed of not less than eight impulses per second nor not more than twelve impulses per second unless otherwise specified on the assembly drawing."

To facilitate the above adjustments, the following tools should be utilized, namely, a set of thickness gauges, a pair of spring adjusting pliers, a spring bending tool, a a gram gauge. These tools may be obtained from the manufacturer or from a telephone supply jobber.

Lubrication of the Dial

NEXT to the foregoing described adjustments of the dial, proper lubrication of the mechanism is very important. The right grade of oil must be used, and the right amount must be applied the essential parts of the mechanism. The manufacturer specifies and furnishes a certain grade of watch oil,

(Please turn to page 34)

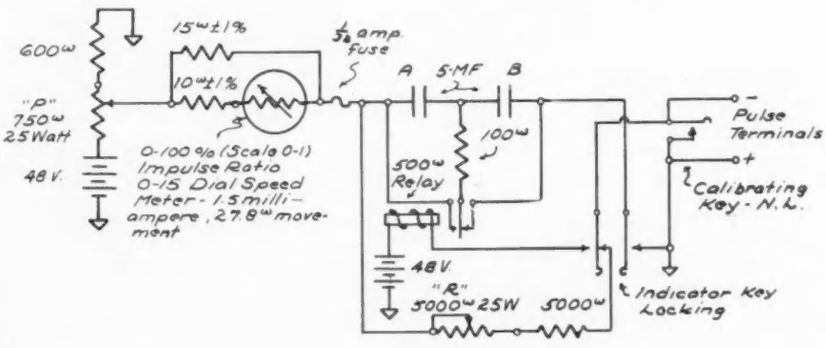
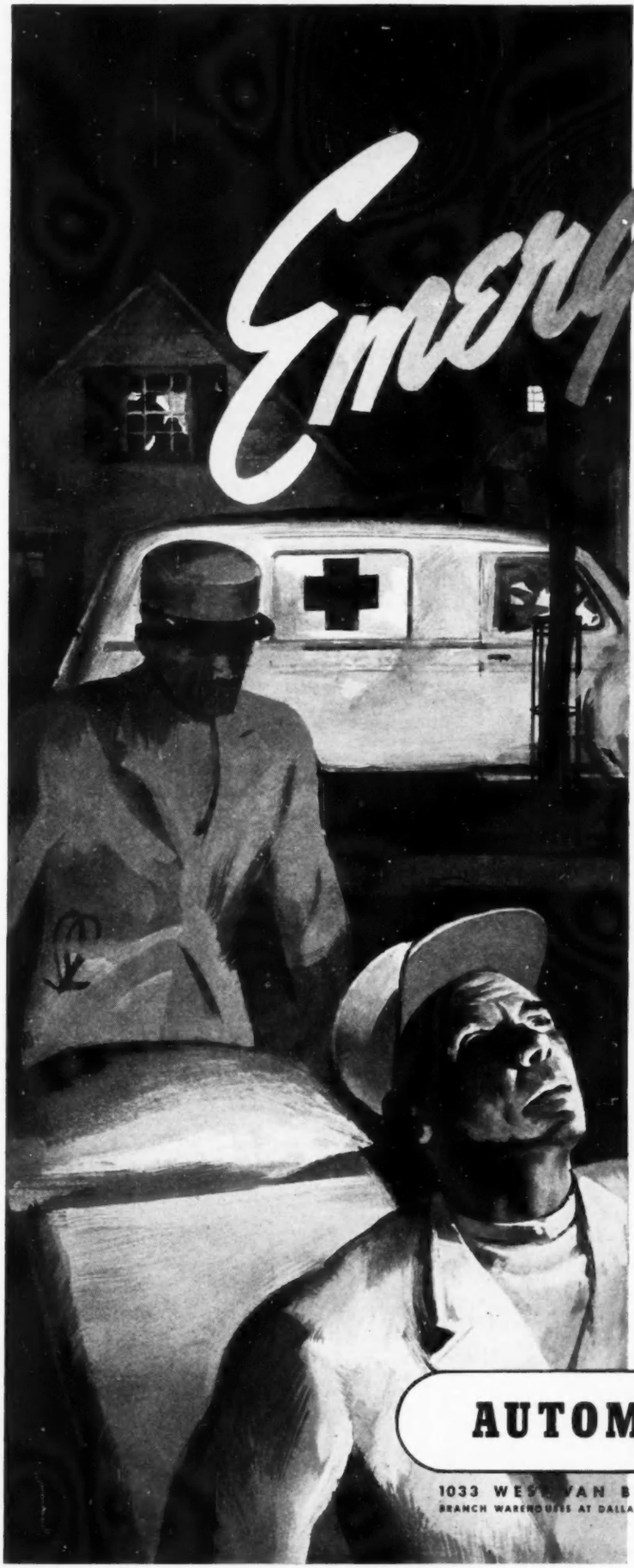


Fig. 4—Circuit diagram of dial speed and impulse ratio indicator.



Emergency!

IN READINESS FOR WHICH SERVICE DROPS, TOO, ARE STANDARDIZED FOR RELIABILITY

The long-established preference for **MONOTYPE** Drop Wire has resulted in hundreds of thousands of subscriber installations... across the land. Their longevity, safety factor and general reliability offer the best of reasons for the continued use of the product.

MONOTYPE DROP WIRE

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GENERAL CABLE CORPORATION
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BRANCH WAREHOUSES AT DALLAS, KANSAS CITY, LOS ANGELES, RICHMOND (VA.), AND SAN FRANCISCO

Only One Wi

Wish Seems to Fit This Christmas

It has long been our happy privilege at this season to send to each of our friends in the telephone industry our wishes for a Merry Christmas and a Happy New Year. And while the clouds of war make the familiar greeting seem out of place, we cannot let this occasion pass without expressing the hope that you will enjoy your full share of the good things that remain and the better things to come in the future.

But because we know that all the Christmas cards in the world will not put another gun in the hands of our fighting men—nor fill the chairs left vacant at so many firesides, we should like to express here the one sentiment which we feel lies closest to the hearts of all thinking men—

Our earnest wish for an early and complete victory, and a lasting peace!

AUTOMATIC ELECTRIC COMPANY

AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

REVISED
BILLING FORMS

New federal tax schedules call for changes in the billing forms of most telephone companies—and in general the new forms are needed right away.

Special Printing Service

Take advantage of Suttle's printing service to help you get new bill forms promptly. We print bills for more telephone men than any other printer, so, it will pay you to check up on our specialized service.

Easy to Order

It's no trouble to order printing from Suttle—Just mark the desired changes on one of your old bills or make a rough sketch of the new form you want and send it in to us. Tell us how many to print. We'll get the forms printed and sent out to you right away. Your satisfaction is assured and the price will be right.

If you are looking for ideas on how to change your bill forms, send us one of your old bills and ask for suggestions. We will send samples, quote prices, and help you all we can.

PRINTING DEPARTMENT
SUTTLE EQUIPMENT CO.
LAWRENCEVILLE, ILL.

New Type Dial Tester

(Continued from page 30)

also a grade of spindle oil (for impulse cam contour and ratchet teeth on main gear). The lubricants are applied in accordance with the manufacturer's instructions. A good tool for this purpose is the Pres-to-automatic oiler (obtainable from the Automatic Electric Company) which saves time in applying the lubricant. It is very important that all surplus oil be wiped off as excess oil remaining collects dust and may eventually gum the mechanism.

Conclusion

AS in the maintenance of other items of telephone equipment, the repair of dials may be made more or less an elaborate procedure as the company desires. The governing factor here is the repair expense. The larger companies usually prefer to confine all dial maintenance to shop repairs, allowing the troubleman to make only the most minor of adjustments to dials on the subscriber's premises. Managements recognize the importance of subscriber's good will and appreciate that many subscriber's object to having a troubleman scattering tools and telephone parts over their premises.

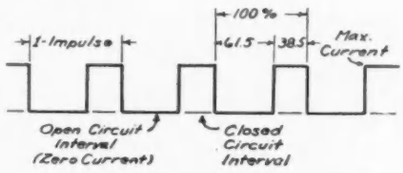

Fig. 3—Diagram showing optimum dial impulse ratio.

Smaller companies may find it more economical to make minor repairs upon the dial on the subscriber's premises. If the troubleman has been properly trained to do the work, he can (1) adjust the spring tension in accordance with factory specifications, (2) adjust dial speed if a speed indicator is available at the test board, (3) retighten loose parts and replace small broken or missing parts, such as a broken finger stop, for example, and (4) lubricate the dial mechanism if the dial acts sluggish.

— END —

I.T.&T. Reports Income For First Half 1942

Net income of $333,556 for the first six months of 1942, compared with a loss last year in the same period of $14,704, was announced recently by the International Telephone & Telegraph Co. The consolidated income account included the parent company and I. T. & T. subsidiaries in the West Indies and South America and certain domestic affiliates, but not the International Standard Electric Corp. and its subsidiaries, the German subsidiaries, the American Cable & Radio Corp., the Spanish Telephone Co., the Mexican Telephone Co. and the Shanghai Telephone Co.

Operating revenues of the companies included in the income account rose to $15,181,706 from last year's $13,810,837, while gross earnings were up to $16,136,227 from the $14,359,195 mark for 1941. Operating expenses were $5,103,831, compared with last year's $4,223,067, while U. S. tax provisions amounted to $387,795, and $1,153,867 was set aside for foreign levies.

In his report to the stockholders, I.T.&T. President Sosthenes Behn recalled that two manufacturing subsidiaries, International Telephone & Radio Manufacturing Corp. and the Federal Telegraph Co., now merged and known as the Federal Telephone and Radio Corp., obtained a credit of $10,000,000 from 10 banks to assist them in financing the production of equipment for U. S. government departments.

"CRACK DOWN"
AS YOU PLEASE . . .
YOU'LL NEVER HURT
YOUR ESTWING

• Crack down—as hard as you please — an Estwing can take it and come back for more. Not only that, but they're built with just that delicate touch of balance needed to pack an added wallop into your swing.

Tough? You bet they are! It's the way they're made—the "I" beam construction with laminated leather handle — as shown in the illustration at left.

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They work together better...
because they can talk together

The marines have landed!
Aside from guts—what got them there?

* * *

First all hell breaks loose
On this strip of sand
As our cruisers and bombers
Lay down a beach barrage
To cover the landing barges
Until they're past
The breakers.

Then, as the shallow-draft hulls
Scrape the sand . . .
And men from Montana and Manhattan
Splash ashore to establish a beach head . . .
The barrage *lifts* . . . bites deeper
Toward the airport to be taken.

Thus *teamwork* . . .
Teamwork made possible by
The Radiotelephone . . .
Keeps our cruisers posted
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Conducted by B. C. BURDEN, Technical Editor

Line AND Desk

Pole Line & Open Wire

Q. Should the end of an iron wire tie be cut off close to the line wire or bent back towards the insulator?

A. There seems to be two schools of thought on this question. The larger telephone companies after making at least two turns around the line wire with the tie, cut it off close to the line wire, whereas, many of the smaller companies find it more convenient to make two or three turns around the line wire and then bend the excess end back toward the insulator. The idea being that this makes it easier to remove or loosen the tie when slack is pulled or when the wire is taken down.

Q. What is the essential difference between the toll line insulator and the double petticoat insulator?

A. The toll line insulator is intended for a relatively minor haul on short toll circuits, whereas the DP or **double petticoat insulator,** because of its longer insulated path, improves the insulation of the line and performance under wet weather conditions, and is used on the better grade of circuits. There is of course still another type of insulator, namely, the **pyrex,** or low loss type which is found principally on the long distance lines of the Bell system and particularly those which are operated with carrier circuits. These insulators have a much lower dielectric loss to high frequencies hence are essential where carrier circuits are involved.

Q. Which makes the best ground for a substation protector, a water pipe or a ⅜ inch 5 foot ground rod?

A. Assuming a good connection to the water pipe and particularly where the connection can be made on a cold water pipe relatively close to the water meter or behind the meter, the water pipe is by far the better ground. The ordinary substation driven ground may be as high as 150 ohms whereas the ordinary water pipe has a resistance of only a few ohms to earth.

Q. What size ground wire should be used in connecting a pole type protector to earth?

A. A No. 6 B&S rubber covered copper wire has always been considered standard in the past. It is the writers belief that if you have difficulty in getting this type of wire at the present time, that ordinary 104 hard drawn copper wire would serve just as satisfactorily as the No. 6 as its slightly higher resistance and lower maximum current capacity is inconsequential for the purpose for which it is used. No. 6 copperweld wire is also a very satisfactory substitute if it can be obtained.

Testing and Transmission

Q. We have a ringing machine which the manufacturer states has an output of 90 volts, yet, when tested with an A.C. voltmeter, this machine shows only 59 volts, yet it seems to work satisfactorily on long multi-party rural lines. What do you think is wrong?

A. It would appear that you are using a **low impedance type** voltmeter to read the output of your ringing machine and the current required by the voltmeter imposes a load on the machine resulting in a high internal drop which makes the terminal voltage appear lower than is actually the case when supplying the actual ringing current. Some chief A.C. voltmeters have impedances as low as 30 ohms per volt which would mean that a 100 volt instrument would offer the same load as a 3000 ohm resistor placed across the ringing machine terminals.

Questions Answered FREE

We welcome questions from every reader. If quick direct mail reply is needed please enclose stamped addressed envelope.

Q. I would like to be able to measure the magnitude of the voice currents in an ordinary telephone line. What instrument can be used for this purpose?

A. A sensitive **rectifier type milliameter** will read the voice frequency currents, however, the impedance of these instruments are relatively high and this has to be taken into account when inserting it in series with a telephone circuit. Voice frequency currents are exceptionally small and difficult to measure with ordinary instruments. A **thermo-couple type** instrument is suitable if one of extreme sensitivity is used. In general, in dealing with voice frequency currents, it is better to measure voltage as it can readily be measured with a rectifier type voltmeter.

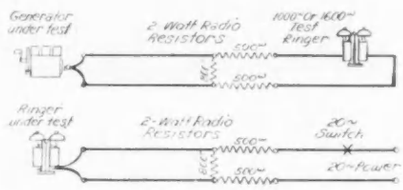

Fig. 1—Generator and ringer test circuit.

Q. In connection with a repair and test bench which we use for the repair of defective telephone instruments, we wish to fix up a generator and ringer test circuit that will simulate conditions comparable to those on a multi-party rural line. Can you suggest a suitable circuit?

A. The best way to test generators, is to connect them to an artificial network, which simulates actual line conditions, and note their ability to produce a good clear ring on a test ringer connected to the output of the network. Ringers are tested in the same way, except that the central office 20 cycle ringing source is passed through the network and the ringer connected to the output. Fig. 1 illustrates these two test circuits.

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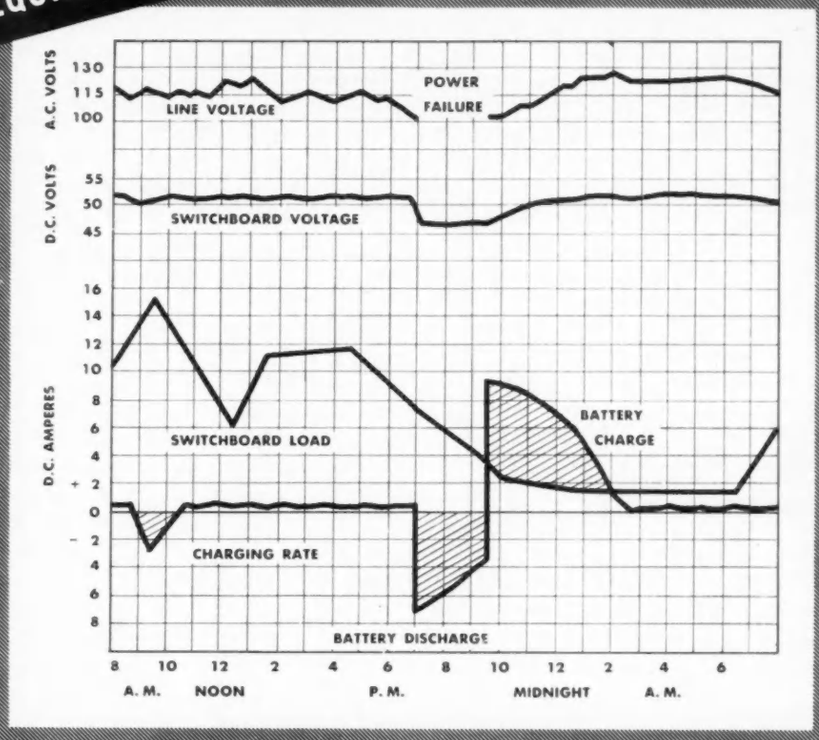

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3. OVERLOAD
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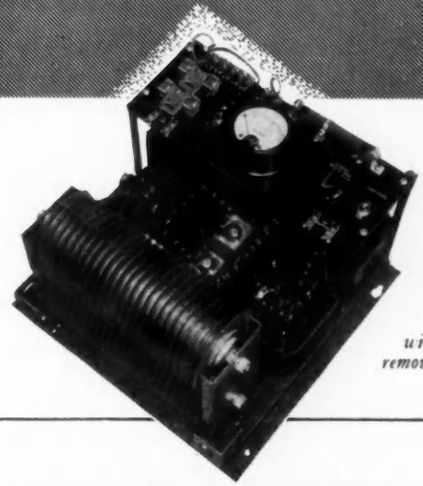
5. AC INTERRUPTION

All of this is accomplished without moving parts and makes the RectiChargeR ideal for unattended operation.

We will be very glad to send you further information or answer any specific questions that you may want to ask.



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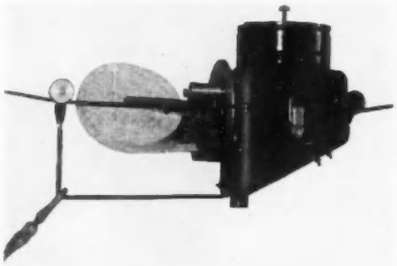

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(Continued from page 22)

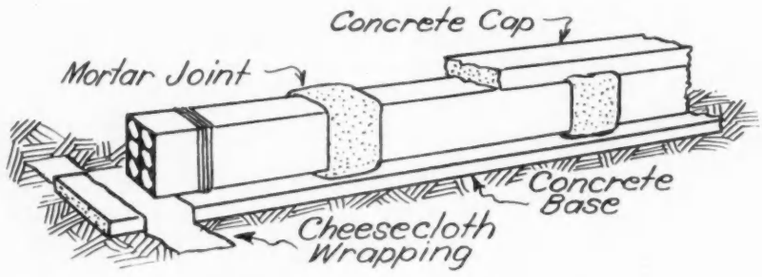

Fig. 4—Method of Installing Multiple Tile Duct.

Where located in parkways or other situations where traffic is not involved, as little as 17 inches of cover over the top of the ducts is considered satisfactory.

Grading of Ducts Between Manholes

IT is quite important that the duct run be properly sloped or graded between manholes otherwise water may collect in pockets and freeze and damage the cable. Pockets also result in accumulations of silt due to rain water getting into the duct system and this may plug a duct so that cable can not be readily pulled in. It is generally desirable to have the duct system drain from one manhole to another rather than in both directions. Figure 3 illustrates the two schemes employed in grading duct systems. The fall should be not less than three inches per hundred.

Digging the Trench

TRENCHING for a conduit run can be accomplished either by hand or with a trenching machine. On large projects the use of a machine is desirable both from the standpoint of cost and the more uniform trench that can be obtained.

The trench is layed out by stretching a chalk line to mark one edge of the trench. Stakes with digging depth marked on them are driven along side of the chalk line at intervals of 50 to 100 feet. It is customary in the larger cities to dig test holes in each block for the purpose of determining if other structures may be present.

The trench width will depend upon the number of ducts in the run. In general the trench is usually made about 6 inches wider than the ducts so that 3 inches of space exists between the conduit and the sides of the trench. Trench width generally ranges from 15 to 20 inches.

When foreign structures are encountered in the path of the conduit run consideration should be given to raising or lowering them so that the conduit run can be kept uniform. Where this is impracticable it may be necessary to grade the conduit so that it will pass over the foreign structure.

Multiple Tile Duct

MULTIPLE tile duct may be laid either directly on the bottom of

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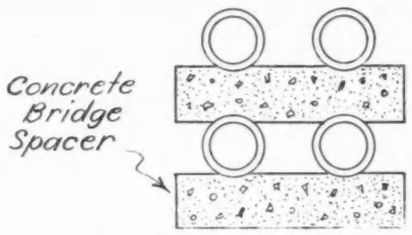


Fig. 6—Concrete Spacers Used in Connection with Tubular Single Duct Conduit.

the trench or on a **concrete base.** If the soil is firm and will provide a good solid surface the expense of a concrete base is not justified. Where a base is used it is generally made of concrete in the proportions of one part cement to 5 parts sand (coarse) and from three to four inches thick. With the trenching completed the ducts are placed and aligned together by means of steel dowel pins. Two pins are placed in each joint in opposite corners.

A strip of cheesecloth (burlap is also used) is placed around the joint as shown in Figure 4 for the purpose of preventing the entrance of mortar which is later applied around the joint. The strip should be from 6 to 9 inches wide. A pad of concrete motar approximately ¾ inches in thickness and 9 inches wide is plastered around the joint.

The Bell System often make use of **Mortar Bandages** in laying multiple tile duct. These are cheese cloth pads with a thin layer of concrete and are layed on the bottom of the trench the joints between adjacent sections of conduit and the duct is set on these pads and jointed together and the pad is then wrapped around the joint. This differs from the method previously described primarily in the greater convenience and assurance of a tight uniform joint.

Where several units of multiple tile ducts are carried in the same trench the joints should be staggered and where placed on top of each other they should be separated by a ½ inch layer of mortar.

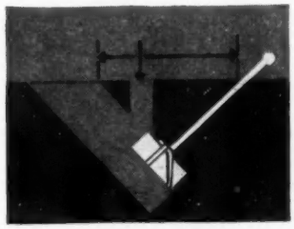
Covering Over Ducts

OPINION differs as to the need for a protective covering over a duct run. Where important trunk or toll cables are involved it is customary to use a concrete covering. This is made the width of the duct and 3 inches in thickness. It is placed by first filling in dirt along side of the duct until level with the top of the duct. A wooden form (usually 18 foot in length) and the same width as the duct is placed over the duct run and the concrete poured into the form after which the dirt is filled in level with the top

FOLLOW THESE HINTS FOR FASTER

ANCHOR SALVAGE

Putting abandoned anchors back in service saves materials and avoids delivery delays. Here are some hints for retrieving them.



NEVER-CREEP ANCHORS. It is unnecessary to dig a pit, or to rebore the original hole. Instead, bore *straight down* at a point ⅔ of the distance from the rod to the edge of the original hole (see illustration). This should strike the top of the anchor plate and permit the hook on a Never-Creep Installing Bar to be attached. Now drive the rod down a few inches, lift the plate a few inches, and pull the rod out. The plate can then be lifted out of the hole with the installing bar.

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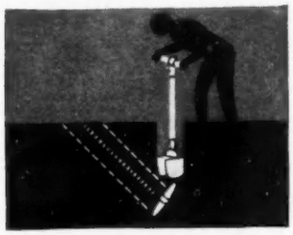
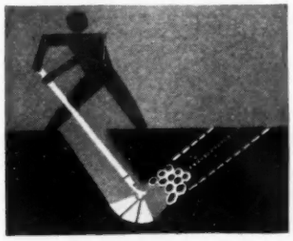


EXPANDING ANCHORS. First, unscrew and remove the rod by using a small bar in the eye as a wrench. Now bore straight down over the anchor, hook onto it with the installing bar and pull it out of the hole. This is generally easier than reboring the original hole and attempting to collapse the anchor before removal.

★ ★ ★



CONE ANCHORS. Removing a cone anchor is usually more difficult because of the rocks used in perfecting the wedge. Bore a hole back of the anchor at an angle as illustrated. After the cone has been located and the rod removed, the anchor can be manipulated around and removed with the hook on the installing bar, free from the obstructing rocks.

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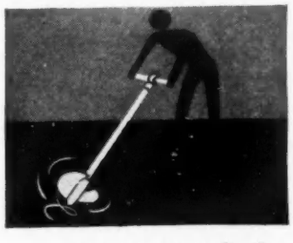

SCREW ANCHORS. No-wrench screw anchors are removed simply by turning them counter-clockwise using a rod through the eye as a wrench. A counter-clockwise turn on Rock Anchors reduces the expansion and permits their withdrawal through the drilled hole.

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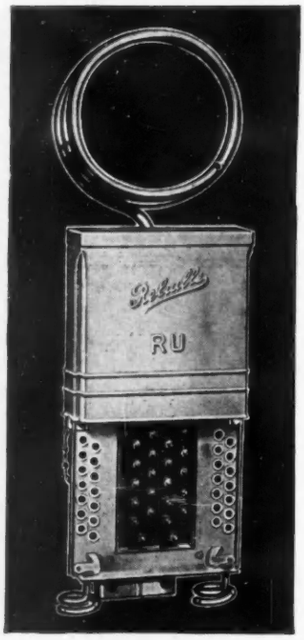

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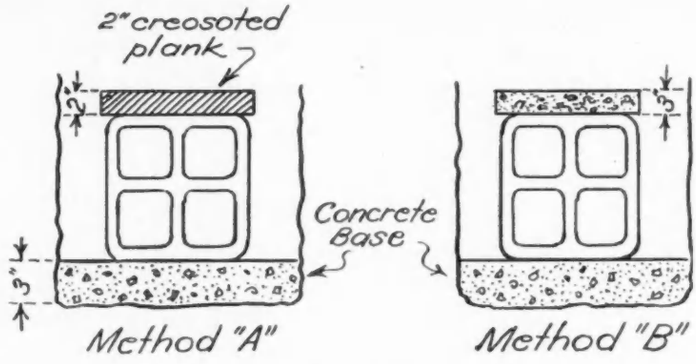

Fig . 5—Top Protection for U.G. Conduit

of the concrete and the form removed. Back filling should not start until the concrete has set. Fig. 5 illustrates the use of a protective top. In all of the various operations in the laying of multiple tile duct care must be taken to keep the concrete lined up. This will require that it either be kept in alignment with a chalk line or by sighting down the run. When earth is placed along side of the duct prior to putting on the concrete cap there is a tendency for individual sections to be forced out of line and the construction foreman must be constantly on guard as a section badly out of line may result in subsequent damage to the cable being pulled in.

Some companies prefer the use of two inch creosoted plank as a protective covering. It has the advantage of being easier to install than concrete but is not quite as resistant to possible mechanical damage to the duct system due to future excavations.

Duct System Consisting of Transite or Fibre Tubes

ANOTHER popular type of duct system consists in assembling the desired number of ducts in the form of ten foot lengths of transite or fibre tubular conduit. These ducts are held apart by spacing materials and a concrete envelope poured around them to form a solid structure having great strength and arranged in any desired pattern.

Figure 6 illustrates how spacing material is used and how the joints are staggered. In some instances it is feasible to use fibre or transite tubular ducts without concrete envelope but only where no overhead traffic is involved. This type of conduit is easily assembled as slip joints are used and can be made up in any desired number or arrangement of ducts. Where it is necessary to fan out a duct system in order to pass over or under a foreign

Examination No. 21
UNDERGROUND CONDUIT PLANT

1. **What are the relative advantages and disadvantages of underground conduit plant as compared to aerial plant?**
2. **How do the annual charges on underground plant compare with that of aerial cable plant?**
3. **What are the three essential elements of an underground conduit system?**
4. **What are the controlling factors that fix the distance between manholes?**
5. **What type of duct is available for use where the position of a conduit run must be changed in passing over intervening objects?**
6. **Of what value is the route and profile maps in connection with underground conduit construction?**
7. **Explain how a profile map is prepared?**
8. **What is the minimum fall that should be given a duct run between manholes?**
9. **Describe the procedure in laying multiple tile duct directly on bottom of trench without a concrete base.**
10. **Describe one method of laying individual tubular ducts to make up a multiple duct run.**

structure this can be readily accomplished.

Tubular ducts are occassionally laid by merely pouring a layer of concrete in the bottom of the trench, then laying in the ducts after which another layer of concrete is poured and the next layer of ducts placed. This requires the use of a fairly dry mix and considerable care to insure that the ducts are properly spaced and aligned.

For long single duct runs where no protection is required, an ideal duct material is transite which has considerable strength and long life.

(Course to be continued)

OBITUARY

M. E. Shipley

M. E. Shipley, 75, for almost 40 years manager of the Hooper (Nebr.) Telephone Company, died November 25 following a lingering illness that caused his retirement in October of 1940.

Mr. Shipley entered the telephone business as general manager of the Hooper Telephone Company in 1901 after selling his newspaper in Hooper, the Sentinel. At that time he was an organizer of the company with a heavy financial interest. He was one of the real Independent Pioneers and in the early days fought hard and earnestly to preserve the Independent spirit in telephony. During his active life he had many activities of a public nature including the ownership of the Hooper Electric Light & Power system which he sold in 1911. In addition he and his son built and operated a telephone exchange at Lusk, Wyo., besides the electric light plant at Rushville, Nebr.

During Mr. Shipley's lifetime he served a number of years in the publishing business, was an extensive dealer in real estate, and served in the Nebraska legislature in addition to his duties with the telephone company. His community services included leadership in the Masons, Knights of Pythias, Eastern Star and the promotion of choral and music groups in his vicinity. He directed a number of other organizations during his active business life. The Hooper Telephone Company also has exchanges at Euhling and Winslow, Nebraska.

Surviving are Mrs. Shipley and one son, T. C. Shipley.

General Corp. Telephone Gain

General Telephone Corporation reports for its subsidiaries a gain of 2,361 company-owned telephones for the month of October, 1942 as compared with a gain of 3,164 telephones for the month of October, 1941. The gain for the first ten months of 1942 totals 25,761 or 4.45% as compared with a gain of 37,641 telephones or 7.07% for the corresponding period of 1941. The subsidiaries now have in operation 605,266 company-owned telephones.

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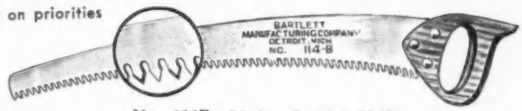

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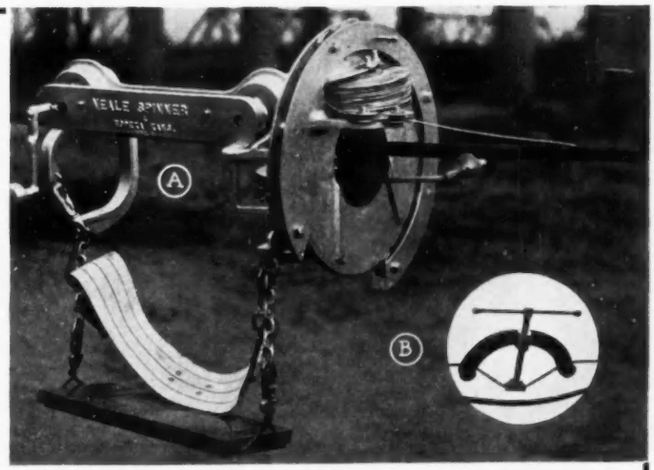

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Personals from the field

A 31-year old Navy Lieutenant Commander, **Bruce McCandless,** Communications Officer on the U.S.S. San Francisco, knocked unconscious and wounded by enemy fire in the Nov. 13 engagement with the Japs off Guadalcanal, revived to find the Admiral and Captain of the ship killed in action and assuming command of the ship led the American column through two enemy lines. President **Roosevelt** personally commended the initiative and courage of Commander McCandless.

●

L. M. Rose, formerly of Kilgore, Texas, last month assumed the management of the Salem, Mo., exchange of the United Telephone Co. **Rose** has been associated with the Southwestern Bell in Texas until recently when he became chief wire man for the United at Rolla.

●

Dewey Malish is the new manager of the Commonwealth Telephone Company in Dodgeville, Wis., to succeed **C. W. Shanbarker.**

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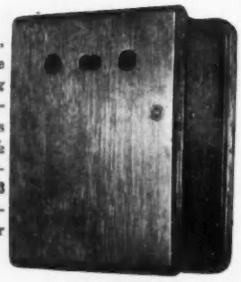

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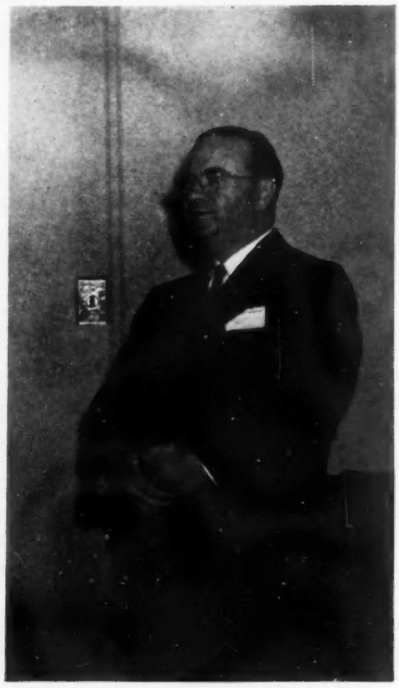

R. B. "Bob" Miles, of the Kansas City office of the Kellogg Switchboard & Supply Co., is the photographer to whom we are indebted for the pictures of the Missouri convention carried in this issue. Your editor indeed appreciates and thanks **Bob** for his picture record of the meeting.

●

G. W. Wells, manager of the Northwest Telephone Company at Sheridan, Oregon, was principal speaker at his local Rotary Club meeting during November. His activity could well be emulated by many telephone executives all over the country as it is now of utmost importance that telephone men tell their activities and troubles to their representative citizens. His subject was "Telephone War Work."

●

Lee Wilson is the new manager of the Thomas, Okla. exchange of the Western Light & Telephone Company.

●

W. J. (Jack) Frost, who has been wire chief for the United Telephone Co. in Rolla, Mo., for the past five years, has moved to St. Louis and reported for work in the equipment dept. of the Southwestern Bell Telephone Co.

●

Roy Poore is the new manager of the Linneus, Mo., exchange of the Western Light and Telephone Co. **Earl Bennet,** former manager at Keytesville, Mo., succeeds him at Brunswick, Mo. **Gene Baskett,** formerly manager of Linneus, succeeds **Mr. Bennet.**

●

Colonel Sosthenes Behn, president of the International Telephone & Telegraph Company, was company host to **President Carlos Arroyo del Rio** of Ecuador and his official party at an informal luncheon on December 2 at the penthouse of the company building at 67 Broad St., New York.

●

William Ackerman, lineman for the Park Ridge, Ill., exchange of the Central Electric & Telephone Company, through quick acting and quick thinking caught a power company lineman recently as he was falling head first from the roof of a house that was being moved along a paved highway. Nice catching on a 35-feet fall!

●

"Razz" Gibson, trouble shooter for the West Coast Telephone Company at Everett, Washington, did a neat bit of trouble shooting during a near hurricane storm last month. So many poles were down that his first job was to extricate an automobile that was pinned securely on the highway. Much trouble resulted from the blow which put out many lines.

●

James T. Buckley, president of the Philco Corporation, celebrated his 30th Anniversary with that company during November.

●

E. B. Samp, manager of the La-Crosse, Wisc. exchange and district manager of the Central Electric and Telephone Co. properties, attended along with a number of business executives the special War Department course for civilians given at the Army's Command and General Staff School at Fort Leavenworth, Kan. The course began on October 26th and lasted 4 weeks. **Mr. Samp** received his invitation to attend as the representative of the Independent telephone industry from Lt. General Brehon Somervell.

●

H. C. Ouradnik has resigned his position of wire chief with the Central Electric and Telephone Company at Devils Lake, N. D. to take a similar position with the Pecos and Northwestern Telephone Company of Pecos, Texas.

●

T. DeWitt Talmage, chief communication engineer of the Tennessee Valley Authority, has been suffering from

the effects of an infection in Chattanooga, Tenn. Recent reports indicate that he will be back on the job within a few weeks. **Mr. Talmage** will be recalled by TELEPHONE ENGINEER readers as a contributor of many technical and commercial articles to this magazine while he was transmission engineer for the Illinois Telephone Association at Springfield, Ill.

●

Fays Scace, who has owned the Corwith (Iowa) Telephone company exchange for 26 years, has sold it to the Central Iowa Telephone company of Cedar Rapids.

●

Chas. F. Richards of Denison, Iowa, has been made manager of the St. John (Kans.) and Sylvia Telephone Exchange.

●

John Ward, combinationman at Troy, North Carolina, and a veteran of World War 1, has been granted a leave of absence to enter a Veterans' Hospital for treatment.

●

Major General Dawson Olmstead, Chief Signal Officer of the Army, delivered the principal address at the formal dedication ceremony Camp Kohler, Calif. on December 1.

●

Carrier-Current Communication On TVA Power System

Your editor was interested in reading a description of the unique carrier-current telephone system used by the Tennessee Valley Authority on its extensive development in the Tennessee river area. The article is entitled "Carrier-Current Relaying and Communication on the TVA System," and is based on an address made at New Orleans, La., before the American Institute of Electrical Engineers by the chief communication engineer of the TVA, Mr. T. DeWitt Talmage, of Chattanooga, Tenn. The article appears in the November issue of Electrical Engineering, the official magazine of the Institute.

Readers of TELEPHONE ENGINEER will remember that Mr. Talmage, while transmission engineer for the Illinois Telephone Association contributed a number of feature articles to the TELEPHONE ENGINEER on a variety of telephone plant engineering and maintenance subjects.

According to Mr. Talmage, the arrangement of carrier-current telephone channels was determined after a study which considered the balance between the reliability and flexibility needed, and the cost of the resulting layout, including the necessity for quick communication between related points in any one area, and provisions for extending the carrier communication service.

Because carrier channels offer definite savings possibilities both in investment as well as in the use of critical materials, every alert telephone manager and engineer should familiarize himself with the general as well as the special applications of this equipment which is so broadly used throughout this country. Mr. Talmage has spent 9 years with the TVA directing the construction of the largest and most modern communication system of its kind. The carrier article is well illustrated and copies may be secured from the American Institute of Electrical Engineers, 33 West 39th St., New York, N. Y.

Who makes it? . . .
Who sells it? . . .
The 1943 BUYERS GUIDE will have all the answers.

HEMINGRAYS *ENDURE*

Hemingray No. 9 for rural lines. Drip points on petticoat accelerate moisture run-off.

LOW IN COST and long in service-life . . . sold only by principal jobbers.

Put These Money-Savers On All Your Lines

HEMINGRAYS don't tax your operating budget. They actually save money because they outlive poles, hardware and crossarms; "keep up their money-saving efforts for 50 years"—one prominent utility reports.

A SECRET glass "batch-mix"—climax of 87 years of experience—plus Owens-Illinois quality-controlled production, results in Hemingrays free of voids, stresses and strains . . . so homogeneous that sudden changes of temperature leave them unimpaired to work perfectly through sun, rain, hail, snow and sleet.

3 FAVORITES ON RURAL LINES— Sturdy, all-purpose Hemingray Number 16. Hemingray Number 42, with its long leakage path keeping "toll" lines trouble free. Number 9 (illustrated). Get Samples.

DISTRIBUTED BY:

STROMBERG-CARLSON TELEPHONE MFG. CO.
Factory and General Offices: 100 Carlson Road, Rochester, N. Y., U. S. A.
Branch Offices: Chicago Kansas City San Francisco Toronto

AMERICAN CROSS-ARM, INC.

The Finest Quality

CROSS-ARMS

- **WASHINGTON FIR**
- **CREOSOTED YELLOW PINE**
- **GULF-RED CYPRESS**

Distributed By:

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Factory and General Offices: 100 Carlson Road, Rochester, N. Y., U. S. A.
Branch Offices: Chicago Kansas City San Francisco Toronto

The eyes of all America are upon the United States Treasury Roll of Honor appearing in the "Payroll Savings News." For copy write War Savings Staff, Treasury Department, Washington, D. C.

HOW TO "TOP THAT 10% BY NEW YEAR'S"

Out of the 13 labor-management conferences sponsored by the National Committee for Payroll Savings and conducted by the Treasury Department throughout the Nation has come this formula for reaching the 10% of gross payroll War Bond objective:

1. ***Decide to get 10%.***
   It has been the Treasury experience wherever management and labor have gotten together and decided the job could be done, the job was done.
2. ***Get a committee of labor and management to work out details for solicitation.***
   a. They, in turn, will appoint captain-leaders or chairmen who will be responsible for actual solicitation of no more than 10 workers.
   b. A card should be prepared for each and every worker with his name on it.
   c. An estimate should be made of the possible amount each worker can set aside so that an "over-all" of 10% is achieved. Some may not be able to set aside 10%, others can save more.
3. ***Set aside a date to start the drive.***
4. ***There should be little or no time between the announcement of the drive and the drive itself.***
   The drive should last not over 1 week.
5. The opening of the drive may be through a talk, a rally, or just a plain announcement in each department.
6. Schedule competition between departments; show progress charts daily.
7. Set as a goal the Treasury flag with a "T."

As of today, more than 20,000 firms of all sizes have reached the "Honor Roll" goal of at least 10% of the gross payroll in War Bonds. This is a glorious testimony to the voluntary American way of facing emergencies.

But there is still more to be done. By January 1st, 1943, the Treasury hopes to raise participation from the present total of around 20,000,000 employees investing an average of 8% of earnings to over 30,000,000 investing an average of at least 10% of earnings in War Bonds.

You are urged to set your own sights accordingly and to do all in your power to start the new year on the Roll of Honor, to give War Bonds for bonuses, and to purchase up to the limit, both personally and as a company, of Series F and G Bonds. (Remember that the new limitation of purchases of F and G Bonds in any one calendar year has been increased from $50,000 to $100,000.)

TIME IS SHORT. Our country is counting on you to—

"TOP THAT 10% BY NEW YEAR'S"

EVERYBODY EVERY PAYDAY AT LEAST 10%

Save with
War Savings Bonds

This space is a Contribution to America's All-Out War Effort by **TELEPHONE ENGINEER**

Supreme Court to Rule

THE issue of whether an independent telephone union, the Association of Southern Bell Employees, is under the domination of the Southern Bell's management is to be scrutinized by the U.S. Supreme Court as the result of the highest tribunal's decision to review a unanimous Circuit Court finding which had rejected the order of the National Labor Relations Board disestablishing the employees' organization.

The case will be argued before the Supreme Court in January or early February. If the Supreme Court should uphold the NLRB, it will be a curious decision because the Southern Bell employees had overwhelmingly voted for their Association after an AFL union had brought charges against it and actually their vote would seem to carry out the principles of the Wagner Act of a majority choice of employees.

The War Labor Board, meanwhile, planned to render an early decision on the dozen wage increase petitions of several Bell System independent unions, most of them NFTW affiliates, and in the case of two Independents. The WLB was slated to grant wage boosts in the case of lower paid employees of the Bell System and to speed up the wage progression system for such classes of workers.

The manpower situation in the communications field has remained without much important change since the Selective Service System had announced the lists of "critical" occupations in the communications operating and manufacturing fields. Local draft boards are given these lists as "guideposts" in granting deferments for employees who are technically skilled and are difficult to replace without at least six months training.

Runs Local "Quiz" Program

The Midway Telephone Company, Medford, Wisc., is the sponsor of the "Dial Quiz" program which is a regular Friday night feature over Station WIGM, Medford, Wisc.

Recently the program has been a contest between 4-man teams with one team at the studio and the other at a local theater. The team winning is presented with $5.00 which is usually turned over to the local Red Cross. The contestants report much fun for themselves, the theater audience and radio listeners.

D. E. Peterson is manager and plant superintendent of the company which also operates at Dorchester and Stetsonville, Wis.

Telephone Expansion Launched in India

A plan of telecommunication development estimated to cost about $24,000,000 has just been started in India to provide for increased civilian traffic, according to the Department of Commerce.

Trunk telephone channels between principal cities will be increased from 65 to 300. A maximum amount of equipment will be manufactured domestically and subordinates and workers will be trained to cushion the problem of labor and materials.

It is believed in India that industrial development and increased telephone and telegraph communication will justify retention of many of the new circuits after the war.

Oregon Companies Combine

Effective November 1, the Lebanon (Ore.) Telephone Company and the Pioneer Telephone Company were combined under the name of the Linn County Telephone Company, according to the announcement of Mrs. Ethel A. Bauman, manager at Lebanon.

WAGNER ANCHORS
PROVED—by Thousands of Installations

Produced in sizes from 55 to 210 sq. in. expanded area.

Thousands of installations from coast to coast prove the efficiency of Wagner Anchors.

Every part of these Anchors is made from malleable iron, which is recognized by engineers as the best-known material for use where strength, ductility, and rust-resisting qualities are concerned.

Every part used is produced in the manufacturer's own foundry, where tests are made of each heat, for tensile strength, elongation, and physical properties of the iron.

Distributed By:

STROMBERG-CARLSON TELEPHONE MFG. CO.
Factory and General Offices: 100 Carlson Rd., Rochester, N. Y., U. S. A.
Branch Offices: Chicago Kansas City San Francisco Toronto

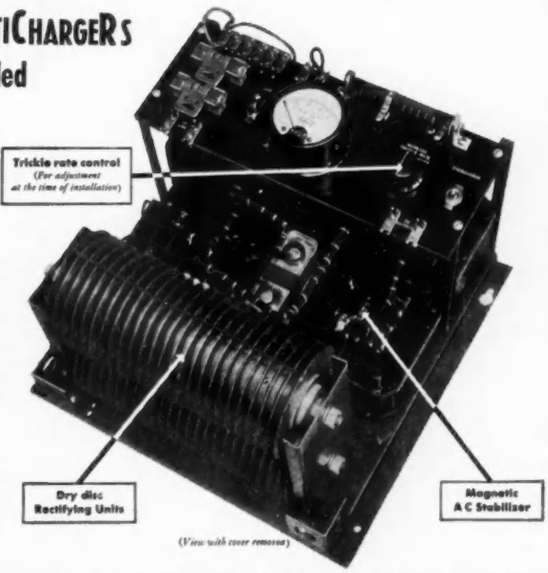
RAYTHEON RECTICHARGERS
Operate Unattended

Plug 'em in — go away and forget 'em. What a pleasure it is to use a battery charger without moving or expendable parts. Nothing that requires frequent adjustment.

The design of the Raytheon **RectiChargeR** enables its output to follow the load and assume full responsibility for keeping your storage batteries fully charged, neither burning them up by overcharging nor starving them by undercharging.

Battery life may be increased as much as 40%.

Operating difficulties caused by under and over voltage are automatically eliminated.



(View with cover removed)

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STROMBERG-CARLSON TELEPHONE MFG. CO.
Factory and General Offices: 100 Carlson Rd., Rochester, N. Y., U. S. A.
Branch Offices: Chicago Kansas City San Francisco Toronto

WAR needs the wires this Christmas

War can't wait—not even for Christmas. So please don't make Long Distance calls to war-busy centers this Christmas unless they're vital... BELL TELEPHONE SYSTEM

Proposing a Holiday for "Holiday" calls

★

These two advertisements will appear in national magazines during December. They are designed to help forestall the annual flood of Christmas calls — especially to centers of war activity. They should serve to ease the industry's holiday traffic problem.

AN ADVERTISEMENT OF THE BELL TELEPHONE SYSTEM

PLEASE DON'T CALL LONG DISTANCE THIS CHRISTMAS!

IT MAY be the "holiday season"—but war needs the wires that you used to use for Christmas calls.

Long Distance lines are loaded with urgent messages. Extra lines cannot be added because copper and other materials are needed for the war.

So—this Christmas please don't make any Long Distance calls to war-busy centers unless they're vital.

WAR CALLS COME FIRST
BELL TELEPHONE SYSTEM

SUB-CYCLE

MASTER RINGING CONVERTER

"The Choice of the Telephone Industry"
Because There's—

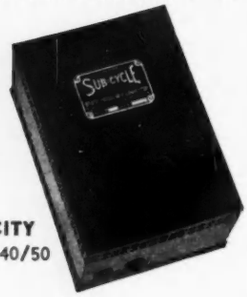
NOTHING TO ADJUST
NO MOVING PARTS
NO ROUTINE MAINTENANCE

BUILT FOR HEAVY DUTY

SUB-CYCLE provides ample power. Cannot interfere with radio reception. It is quiet and economical in operation.

SIX MODELS

For loads ranging from small PBX to the large Central office.



OUTPUT CAPACITY

7½ watts to 40/50 watts.

ALSO PULSATORS

Sold by Leading Distributors

THE LORAIN PRODUCTS CORPORATION
LORAIN, OHIO

Do More With Less Help!

SEYMOUR SMITH
TELEPHONE PRUNERS

CUT FASTER, COVER MORE GROUND-Keen "Center-Cut" blade slices between two strong side supports. Branch is firmly gripped, quickly cut. Ask for prices.

SEYMOUR SMITH & SON, Inc.
483 Main St., Oakville, Conn.

Missouri 1-Day Convention Considered a Success

Snapped at the Missouri Convention. (L. to R.) Frank Heyes, R. A. Feasel, Wayne Berry, Wilber Naylor, C. A. Krueger, M. A. Osborne, and R. C. Krueger. Bob Miles is the cameraman.

THE usual 3-day convention of the Missouri Telephone Association was streamlined to a 1-day session for 1943 and met in Kansas City on Nov. 17 for a very peppy conference. Exhibits of the manufacturers were absent because of wartime, and secretary R. W. Hedrick scheduled a very informal program. Association officials considered the meeting most worthwhile.

No changes were made in the executive personnel or directorship of the Association. Officers re-elected are as follows: Dr. S. T. Neill, Clinton, president; J. R. Carter, Perry, 1st vice president; W. R. Journey, Higginsville, 2nd vice president; J. M. Roberts, Gallatin, 3rd vice president; Elmer Weakley, Plattsburg, 4th vice president; and R. W. Hedrick, Jefferson City, secretary-treasurer.

Executive committee members re-elected were: C. W. Boutin, Cape Girardeau; F. B. McHenry, Jefferson City; M. J. Stooker, Kansas City; H. C. Todd, Maryville C. A. Vedder, St. Louis; W. N. Curtis, Columbia; George A. Hearne, Warrenburg; Carl A. Spaid, Kansas City and F. M. Browne, Kansas City.

During the meeting there were several Round Table Discussions which accomplished a much better understanding of the outstanding problems of the various divisions of telephone company operation.

W. H. Knight, chief, Miscellaneous Tax Division, U.S. Collector's office, Kansas City, explained recent changes in Federal Taxes. His address was well attended and proved very valuable to the membership as the new Revenue Tax of 1942 had just been passed and needed many explanatory remarks.

Louis Pitcher represented the United States Independent Telephone Association and gave the convention the latest news of the industry. Mr. Pitcher usually covers the entire news front on items of interest to telephone men. His speech was widely quoted by Missouri papers after his address.

Frank C. Heyes of the Kellogg Switchboard & Supply Company, and in charge of the Priorities Department, gave information on the subject of priorities and answered many questions

Shields Smith chatting with re-elected Missouri Association President S. T. Neill, Clinton, Mo.

Not surprised by the camera at the Missouri Convention were S. W. Black and S. A. (Gus) Lane of Arkansas.

from the floor. This subject is growing of more importance each day.

Honorable Frederick Stueck, chairman of the Missouri Public Service Commission, discussed the relationship between the state Public Service Commission and operating companies.

Those in attendance congratulated the officers in their decision to hold only a 1-day meeting this year and were rewarded by a close-knit streamlined program that handled the important subjects of interest to the telephone industry in a minimum of time. The usual banquet was dispensed with.

Minnesota Association Dates

The executive committee of the Minnesota Telephone Association has announced their decision to hold a three day convention on January 26, 27 and 28 at the Hotel Lowry, St. Paul, Minnesota. This information reaches us through J. C. Crowley, Jr., secretary of that association.

Illinois Association Selects Site

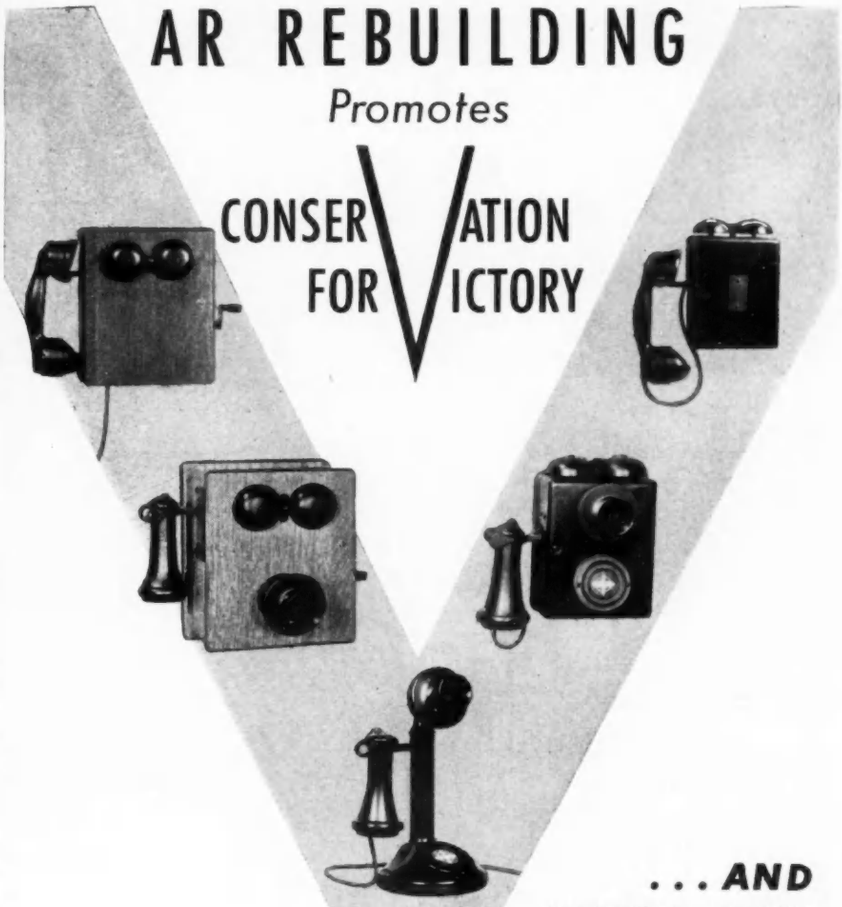
Announcement that the dates of the Illinois Telephone Association 1943 annual convention are April 20 and 21 according to a letter from secretary-treasurer A. J. Parsons. The meeting will be held at the Hotel Knickerbocker in Chicago. This announcement follows a meeting of the directors of the Illinois association which A. J. Joslyn, Sycamore, Ill., heads as president.

The change from the usual convention site of Peoria to Chicago was made because the directors felt that railroad facilities would be much better and therefore would result in better attendance. The board also decided to eliminate the annual banquet and entertainment and hold strictly a business convention.

AR REBUILDING

Promotes

CONSERVATION FOR VICTORY



. . . AND HERE'S WHY

New equipment calls for vast amounts of critical materials—materials which can't now be spared. Autelco Rebuilding uses only a fractional amount of that same material yet furnishes high-grade, up-to-the-minute telephone service for your customers.

Autelco Rebuilding Service is applicable to your every problem—for every type of manual or automatic equipment. You may set up a complete plan for renewing all your apparatus over a period of time. You will be preserving the finest telephone service in your community and you'll be helping Uncle Sam at the same time. Write today for further information and prices.

THE MARK OF QUALITY IN REBUILDING SERVICE

AR Autelco Rebuilt

NOTE: Orders for Autelco Rebuilding service may qualify for priority rating under Maintenance and Repair. Please include priority certification with all orders.

AUTOMATIC ELECTRIC

ORIGINATORS AND DEVELOPERS OF STROWGER STEP-BY-STEP MACHINE SWITCHING AUTOMATIC DIAL SYSTEMS

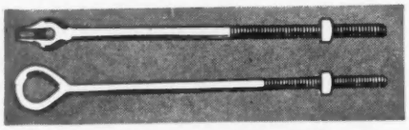
MAKERS OF TELEPHONE, SIGNALING AND COMMUNICATION APPARATUS
ELECTRICAL ENGINEERS, DESIGNERS AND CONSULTANTS

Distributors in U. S. and Possessions:
AMERICAN AUTOMATIC ELECTRIC SALES COMPANY,
1033 W. Van Buren St., Chicago, U. S. A.
Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED

. . . from the
COMPLETE LINE OF
OLIVER
POLE LINE MATERIALS

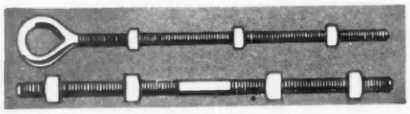
BOLTS
with the time-saving, waste-eliminating Speed Point

(Below) "Thimbleye" Eye Bolts hold strands without using guy thimbles and without causing sharp kinks.



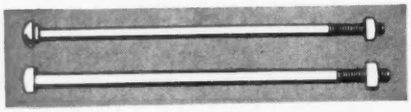
(Above) Drop forged Eye Bolts are made in 26 sizes from mild open hearth steel.

Double Arming Eye Bolts for guying or dead-ending lines on double crossarms.



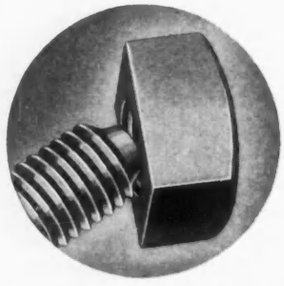
Double Arming Bolts—the modern, economical method for tying two crossarms together!

Carriage Bolts are made in all standard sizes. Square nuts, rolled threads.



Machine Bolts have square nuts, rolled threads. Perfect fit full thread length.

THE OLIVER "SPEED POINT"



All Oliver bolts have the Speed Point, which means faster drive, quicker threading-on, speedier assembly schedule, greater salvage.

OLIVER
IRON AND STEEL
Corporation
Makers of Pole Line Hardware Since 1894
PITTSBURGH, PENNSYLVANIA

Chicago Office of USITA To Close

The Chicago office of the United States Independent Telephone Association at 616 So. Michigan Ave. will close on December 31, and after that date the only office of that association will be located in the Munsey Building, Washington, D. C.

Mr. Clyde S. Bailey, vice president of the association will be in charge of the Washington main office and Mr. Pitcher who has been serving the association as its executive vice president is retiring from association work.

Fred C. Goodwin Passes

Fred C. Goodwin, 65, chairman of the board of the Rochester (N.Y.) Telephone Company, and senior partner of the firm Goodwin, Nixon, Hargrave, Middleton & Devans, attorneys, died December 3 in Rochester, N.Y. He had been ill several months.

Mr. Goodwin was connected with and helped develop some of the largest industries in Rochester and was also a director of Stromberg-Carlson Telephone Mfg. Co., Bausch & Lomb Optical Co., Curtice Brothers Co., Vogt Manufacturing Co., the Rochester Community and War Chest and several other nationally known concerns. He had been a director of the Rochester Telephone Company since 1909 and was made chairman when Mr. Fuller the former president died and Mr. Boylan was made president.

He was credited with guiding the plan of having a locally-controlled and managed telephone company in Rochester and its trade territory to the successful completion realized when Rochester Telephone and the New York Telephone Company were merged into the present corporation in 1921.

Mr. Goodwin was a director and chairman of the trust committee of the Lincoln-Alliance Bank and Trust Company and a director and chairman of the executive committee of the Rochester Gas & Electric Corporation.

He was a member of Third Presbyterian Church, the Rochester and American Bar Associations, Genesee Valley Club, Country Club of Rochester, Rochester Club and Annandale Country Club, Pasadena.

Survivors include three sons, Fred Goodwin, Jr., secretary and treasurer of Rochester Telephone; Philip C. Goodwin, treasurer of the James Johnston Agency Inc., general insurance, and Lieut. Frank J. Goodwin, USA, and four grandchildren.

25 YEARS AGO THIS MONTH

Taken from TELEPHONE ENGINEER files of December, 1917.

Senator Warren G. Harding was the principal speaker at the 22nd annual banquet of the Ohio Independent Telephone Association 25 years ago this month. Officers reelected included Frank L. Beam, Mt. Vernon, president, and directors A. L. Curren, Elyria, C. L. Jones, Athens, and H. P. Folson, Circleville. The Association also heard an address by Major Gustav Hirsch, U. S. Signal Corps Reserves.

★

Twenty-five years ago the thirteenth annual convention of the Illinois Independent Telephone Association was held in Springfield. The operators' school was under the direction of W. S. Vivian, Chicago, and George W. Rodormer, also of Chicago, assisted in presenting the subject "Sub-Station Protection".

★

Expenditures of Bell System companies in new plant for 1917 were approximately $70,000,000. The New York Journal of Commerce editorialized that A. T. & T. was running a bit wild in its construction program. Their war service expenditure of this amount was $10,000,000 for the year. The Priority Board at that time was mentioned with a possibility of action on further expansion.

★

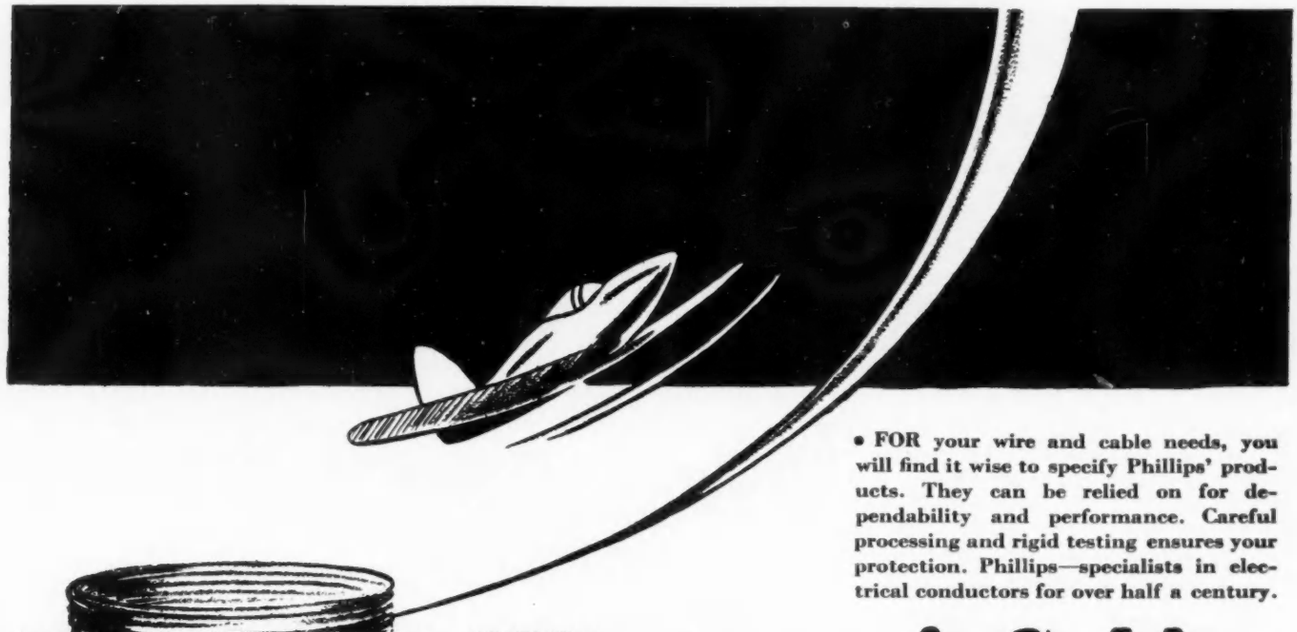
Twenty-five years ago the Bristol Telephone Company representatives were discussing details of the proposed merger with the Cumberland Telephone Company before a joint session of commissioners of Bristol, Tenn.-Va. Albert Parlett was president of the Bristol Company.

★

In December, 1917 an expenditure of $400,000 was authorized by B. F. Sunny, president of the Chicago Telephone Company, for increased cable facilities between Chicago and Great Lakes. Besides the normal increase in population, the establishment of military training camps at Fort Sheridan and Great Lakes had brought a considerable growth in telephone traffic.

★

Twenty-five years ago the Iroquois Public Service Corporation of Syracuse, N. Y. took over the Oswego County Independent Telephone Company of Fulton, the deal involving several hundred thousand dollars.



• FOR your wire and cable needs, you will find it wise to specify Phillips' products. They can be relied on for dependability and performance. Careful processing and rigid testing ensures your protection. Phillips—specialists in electrical conductors for over half a century.

PHILLIPS Wires and Cables

General Distributors:

CANADIAN TELEPHONES & SUPPLIES LIMITED

284 KING ST. WEST, TORONTO

Branches: MONTREAL, BROCKVILLE, WINNIPEG, REGINA, VANCOUVER

Sales Offices: OTTAWA, HAMILTON, EDMONTON

Export Distributors: AUTOMATIC ELECTRIC SALES COMPANY, LIMITED, CHICAGO

Be Sure It CAN'T Be Fixed Before You Replace It!

Even the small amount of strategic materials used in Calculagraphs is precious to our country. We, therefore, urge Calculagraph users to send us their machines for inspection and repairs, if possible, before ordering new ones.

The ticket printed on the Calculagraph tells exactly when toll calls are made and shows the elapsed time automatically figured to the second. It provides a permanent record which saves disputes and increases efficiency.

Made in spring-drive and electrically operated models. Write for particulars.

Model 33

CALCULAGRAPH COMPANY

308 Sussex St., Harrison, N. J.

CALCULAGRAPH

Accurate Toll Timing to the Second!

Advertise in the "Blue Book" & BUYERS GUIDE

and you'll get RESULTS for 12 months!

The 1943 Telephone "Blue Book" & BUYERS' GUIDE will be published and included as a part of the January 15, 1943 issue of TELEPHONE ENGINEER & MANAGEMENT. This will be the 8th annual issue of this "Handyman" for purchasers of telephone equipment and supplies.

It is the only AUTHENTIC and complete directory of Suppliers and Manufacturers—plus the products they serve—published for the huge six billion dollar telephone industry.

During 1941, when manufacturers were not as yet operating almost entirely on war work, the telephone industry spent over six hundred million dollars on installations, rebuilding, maintenance and supplies.

Due to war efforts of the manufacturers, telephone companies are now forced to delay most of their purchases of supplies, equipment for installations, replacements, etc. This will of course result in a tremendous volume of business available immediately for manufacturers with the culmination of the war. Firms doing a good public relations job NOW will reap this big harvest.

Display advertising supplementing the listings of your products (your company furnished us to be included in the BUYERS' GUIDE section) will do an excellent job of reminding this potential market of your resire to serve them . . . and help accomplish a real selling job for you when Victory is ours.

The following page gives brief details. As has been our custom for 8 years—NO ADVANCE IN SPACE RATES for this big issue. Advertising copy should come forward immediately.

GOOD NEIGHBOR POLICY

adopted by

TELEPHONE "BLUE BOOK"

and

BUYERS' GUIDE

1943 Edition circulation will include SOUTH and CENTRAL AMERICA

Start after South and Central America Sales NOW!

DON'T fail to establish

It will help you develop brand new SALES CONTACTS.

—Your name and products in South and Central America as well as in this country. It will pave the way to important post-war SALES OUTLETS.

Start Now!

Supplement your listings in the BUYERS' GUIDE with advertising.

TELEPHONE ENGINEER & MANAGEMENT, The National Telephone Magazine

7720 Sheridan Road Phone Rogers Park 3046 Chicago

A Complete BUYERS' GUIDE
Covering the
$6,000,000,000 Telephone Industry

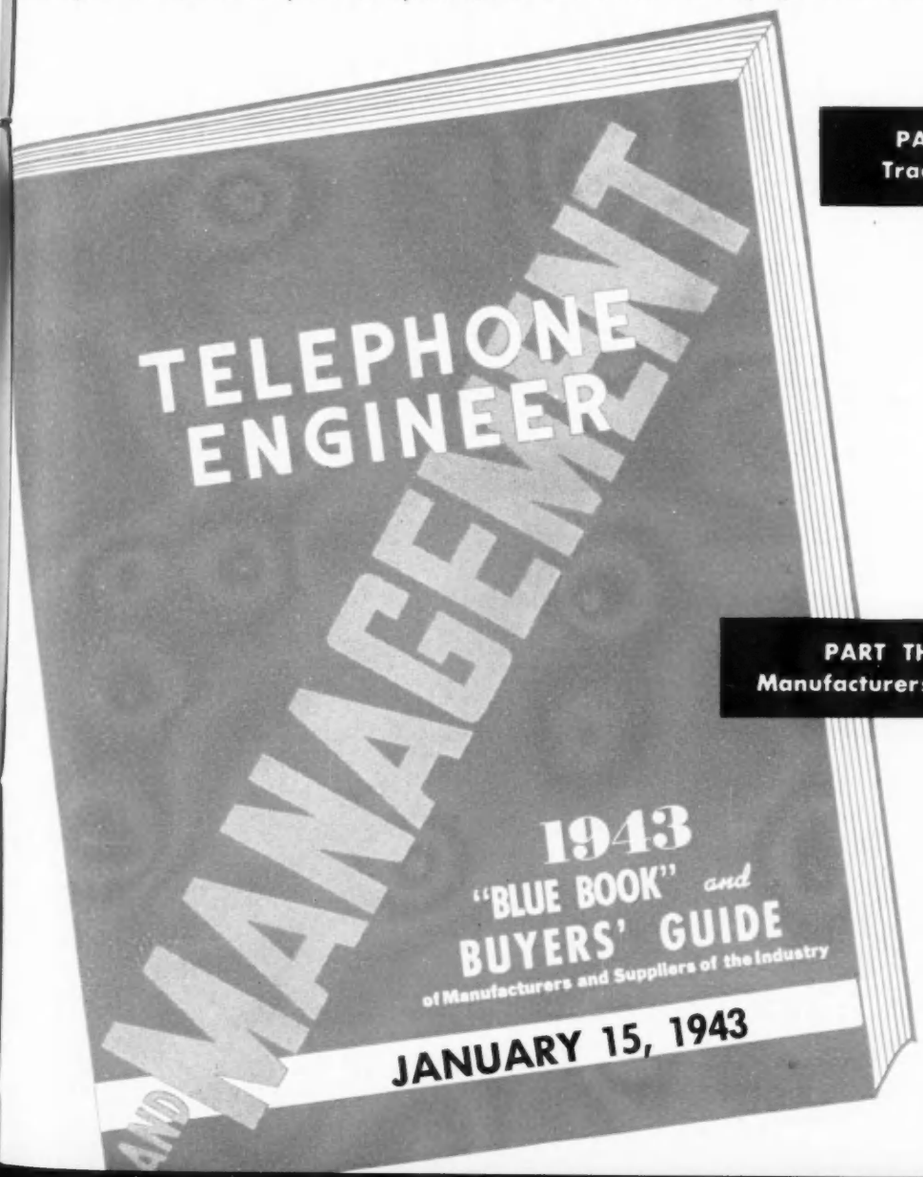
TELEPHONE ENGINEER & MANAGEMENT for January 15, 1943 —a ***regular issue but chock-full of extras***—will be one of the most important we have ever published. At no other time have telephone men been so interested in new products, new materials, substitutes and new sources of supply.

In addition to carrying the usual late telephone news, timely articles on management, construction, maintenance, etc., as does every monthly issue of this field-leading publication, the January 15, issue will include the Telephone "Blue Book" & BUYERS' GUIDE Section printed on the usual light blue paper.

This important Section lists all telephone equipment, supplies, etc., used in the field, all trade names, and all manufacturers with correct names and addresses. It will be one of the most valued working tools of telephone men all next year.

Manufacturers and Suppliers supplementing their listings with advertising will have such fact brought to the readers attention every time their name or product is mentioned in the BUYERS' GUIDE Section.

If you manufacture or merchandise products applicable to the telephone industry, your January 15, BUYERS' GUIDE issue is the ***only*** place where your advertising for a whole year will be on the job when specifications are written and buying decisions made.



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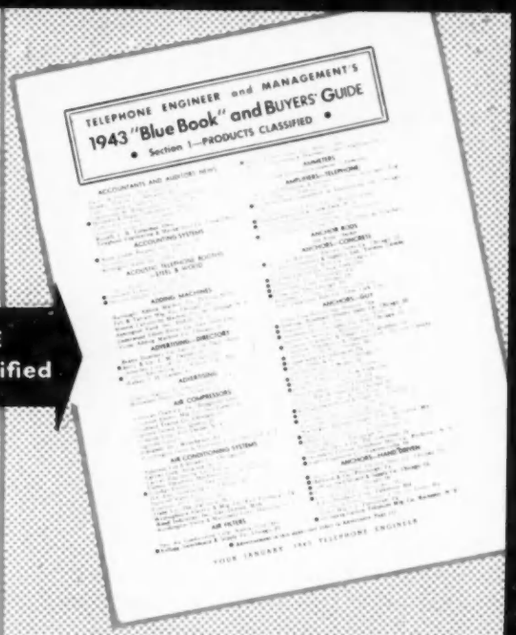

PART TWO
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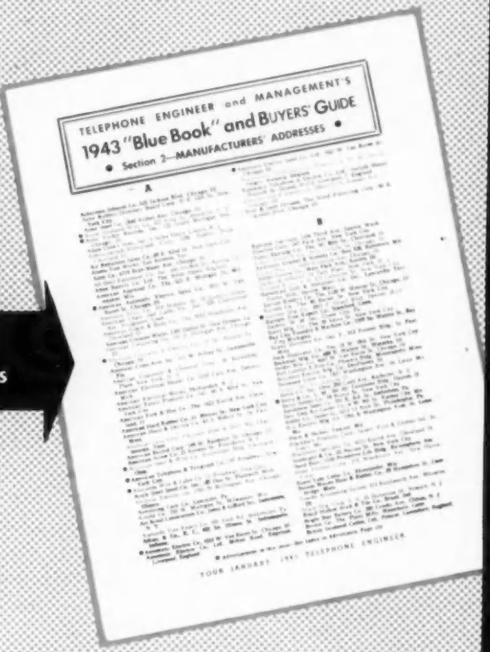
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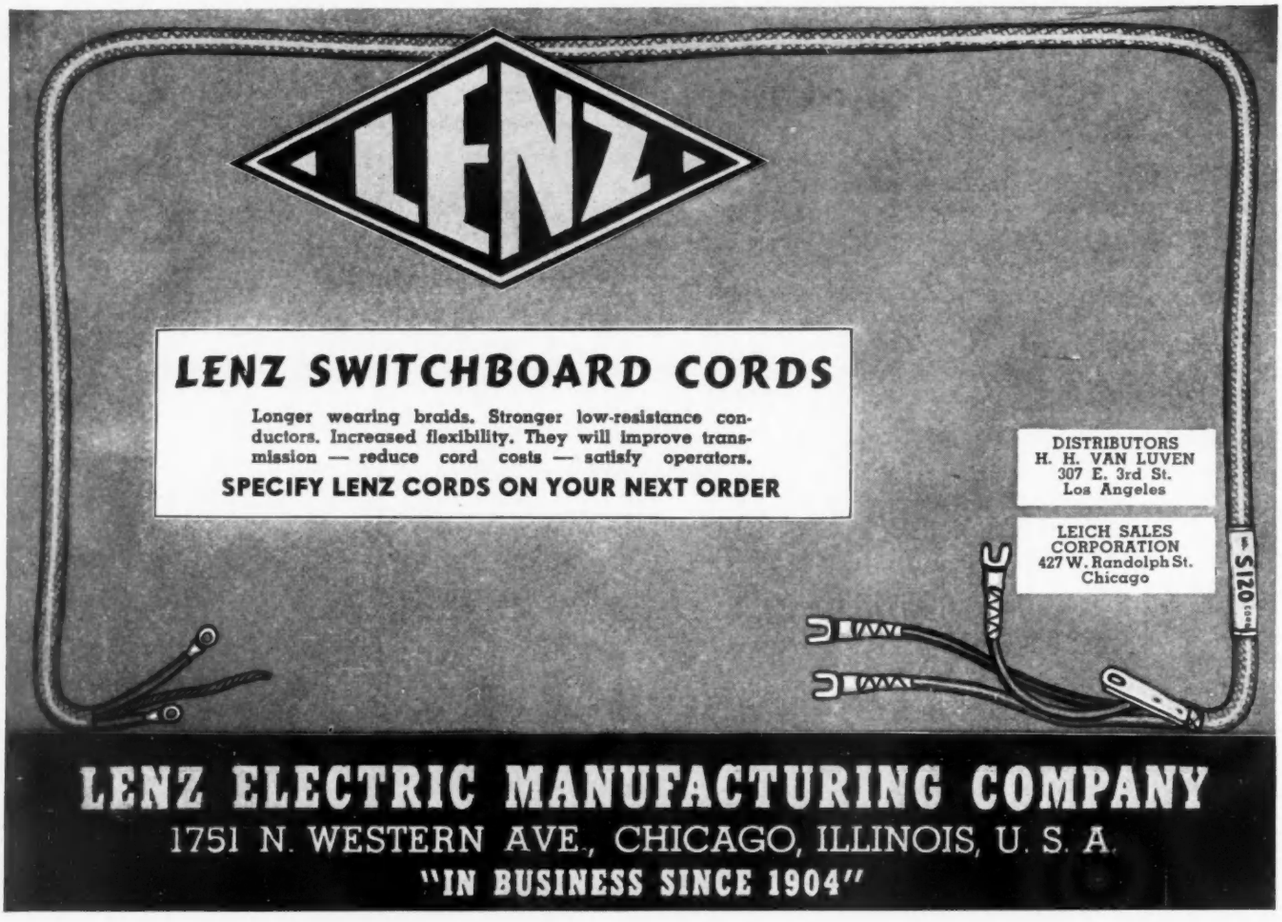
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LENZ SWITCHBOARD CORDS
Longer wearing braids. Stronger low-resistance conductors. Increased flexibility. They will improve transmission — reduce cord costs — satisfy operators.
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1751 N. WESTERN AVE., CHICAGO, ILLINOIS, U. S. A.
"IN BUSINESS SINCE 1904"

Telephone Engineer

HANDBOOK TABLES

By B. C. Burden

Index—Transmission data
Date—Dec. 15, 1942

Transmission Characteristics of Copperweld Telephone Wires

General

The following table gives the transmission loss, and characteristic impedance for Copperweld telephone wire. **40% cond.** refers to the conductivity as compared to copper. **Dry** and **wet** refers to dry weather and wet weather conditions. A **20 db loss** is comparable with that experienced on the longer loops of a large exchange. Because of the saving in copper Copperweld conductors are now extensively employed in the construction of new toll lines to serve the war effort.

Size A. W.G. or Inch	TRANSMISSION EQUIVALENT Decibels (db) per Loop Mile				CHARACTERISTIC IMPEDANCE (Z) Ohms		Approx. Miles of Line Equivalent to 20 db. Loss	
	40% Cond.		30% Cond.					
	Dry	Wet	Dry	Wet	40% Cond.	30% Cond.	40% Cond.	30% Cond.
.165"	.076	.084	.101	.107	645	680	265	200
6	.078	.086	.103	.109	650	685	255	195
8	.111	.118	.144	.149	725	785	180	140
.128"	.112	.119	.145	.150	730	790	180	140
9	.132	.138	.169	.174	775	850	150	120
.104"	.151	.157	.191	.195	825	910	130	105
10	.156	.161	.196	.200	835	925	130	100
12	.216	.220	—	—	1000	—	95	—

The above values are based on open wire construction using D. P. Insulators with twelve inch spacing between conductors and a frequency of 1000 cycles per second.

Highlights of the Communications News

(Continued from page 20)

ment are burdensome upon the public, unjust or unreasonable or should be reduced by an interim order or otherwise; that the FCC computation of excess earnings included all the Federal and state taxes; that the rate of earnings may increase or remain at the present level but rather operating costs, including taxes, have risen during this year and are due to increase further; and—and most important—the present rate of earnings, in view of the substantial rate reductions of the past five years, is produced only because of the temporary combination of the wartime circumstances which will fall off immediately at the close of the conflict. The war has produced an "abnormally high volume of traffic, while wartime restrictions on the use of materials have resulted in the plant to handle that traffic being abnormally low."

If the FCC forces through a rate reduction which stimulates traffic, the A.T.&T. answer emphasized that to maintain the existing quality of toll service for every 10 per cent increase in Long Lines traffic a minimum of 2,200,000 pounds of copper and large quantities of other critical materials would be required and the hiring and training of some 3,000 additional operators as well as more plant and maintenance male workers which would be most difficult in view of the shortages of manpower.

The burdens which the war already has placed upon the Bell System "have been tremendous," the A. T. & T. answer related. That these have been handled successfully have been of vital importance to the war effort, the answer continued. It was pointed out that growth in the toll message traffic of the Long Lines Department has been coincident with increased production as the war progressed. In 1939 the growth was 10.2% over 1938; in 1940 it was 12.7% above 1939; 1941 recorded a 27.9% jump above the preceding year and **1942 recorded the sharp upsurge of 32.5% more traffic than in 1941.** These are averages, the answer added, and there are specific instances involving important centers of war activity where the traffic has more than doubled since 1941, while the total increases in traffic in 1941 and 1942 will equal the increase for the previous 17 years.

Pursuant to the war-time meaning of public interest, which the answer said should guide the FCC in the exercise of all its regulatory jurisdiction whether over facilities, service or rates, **the Bell System companies at the request of the Board of War Communications have been advertising throughout the nation to urge the public not to make unnecessary long distance calls.** In spite of this, the necessary increase in long distance calls involved in war operations and the production of war materiel, has resulted in continued increase in traffic.

"Inability to obtain critical materials," the A. T. & T. answer said, "such as copper, aluminum and nickel

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Selling the advertising in your telephone directories, using experienced salesmen who know how to develop the maximum revenue, as well as maintain and build up public relations with your subscribers.

Our customers include many of the larger Independent and Bell Telephone Companies. We serve telephone companies operating in over 3000 cities and towns, in twenty-two Eastern, Southern, and Middle Western States, and we handle directories of all sizes.

We will either sell your advertising on a commission basis or publish your directories complete.

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L. M. BERRY & CO.

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You cannot buy better pole line hardware than that which bears the L-M trademark

L-M has never considered pole line hardware as so much galvanized steel. It did not so consider it 31 years ago when L-M started. L-M does not so consider it now. Instead, each item is regarded as a standing challenge for its improvement, if possible. The difficulty of improving items of this nature makes that challenge more intriguing.

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AMERICAN AUTOMATIC ELECTRIC SALES COMPANY

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NATIONAL DEFENSE

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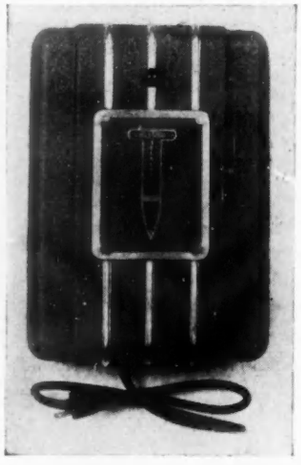
PRIORITY

While "all-out" National Defense co-operation is taxing our production facilities — We are proud we have been able to continue to make satisfactory deliveries to our government and to our customers in the telephone field.

TELERING

Reliable ringing service is essential in providing satisfactory telephone service.



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ELYRIA, OHIO

has made it impossible to provide enough circuits to handle this increased traffic with the speed and certainty heretofore attained. The plant of the Long Lines Department throughout the United States now requires 25% to 35% more intercity circuits to give the same quality of long distance service as was given early in 1940." The answer cited the present situation of "no circuits" delays in war activity centers.

The divisions of toll revenues in joint through rates between the Long Lines Department and the Associated Bell System companies and Independent connecting companies, the A. T. & T. answer cited, have been based on the assumption that those rates paid only for the carriage of messages from toll board to toll board. But if the FCC decides in Docket No. 6328 investigation that such rates pay also for the carriage between the toll board and the subscriber's telephone at each end, all of the latter operations being performed by the connecting carriers, the latter companies will be entitled to a larger share of the interstate toll rates which would mean the A. T. & T. Long Lines Department's share and earnings would be decreased.

WPB Urges Conservation

BECAUSE of the increasingly critical situation in strategic metals and materials, telephone companies were recently advised in a bulletin, prepared under the direction of Leighton H. Peebles, Director of the WPB Communication Equipment Division, to reduce all service to a minimum consistent with public necessity and efficiency and to use every effort to convince users of the imperative need of accepting limited service.

The greater use of bridged telephones or party lines on private branch exchanges both at the time of installation and to provide additional service through existing exchanges; the acceptance of slower service standards as a recognition of essential needs of copper for military and naval uses; determination of the amounts and nature of traffic loads by analyses of calls to limit personal and nonessential business calls and to eliminate unnecessary service as a means of relieving overloaded equipment—these were recommendations of Director Peebles to the industry. Telephone engineers were asked to plan their operations in such a way that the minimum amounts of

"The Acme Munitions Works ought to give me work employing my LEFT hand. Look what's happening."

material will be required for each essential engineering program. The bulletin which is being distributed to the telephone companies was prepared by Bernard C. Burden, Chief of the Exchange Plant Analysis Sub-Unit of the Service Facilities and Operations Section of Mr. Peebles' Division.

Mr. Peebles has made recommendations to government offices suggesting limitation or restriction of personal calls over the private branch exchanges serving governmental agencies. He pointed out that the directives issued by the Signal Corps have accomplished a reduction in overall equipment requirements in Army camps and in restricting long distance service usage. The same efforts are being applied in other governmental agencies.

It was emphasized that telephone companies seeking additional materials and equipment must have demonstrated they have abided by the standards set up under the Limitation Order L-50. The adherence and efforts to live fully up to L-50 will be foremost considerations of the Communications Equipment Division in granting their applications, it was emphasized. The traffic situation in the nation is spotty being particularly bad in the centers of war activity. The Pacific Coast probably presents the most difficult situation.

THE methods for the further limitation of non-essential telephone service and facilities were considered at the Dec. 16 meeting of the WPB Communications Equipment Division's Telephone Operating Industry Advisory Committee. The scrutiny of the inventory situation of the industry was also a subject of study at this meeting as well as the earlier one on Dec. 12 of the Telephone Equipment Manufacturing Industry Advisory Committee.

The bulletin, prepared by Mr. Burden, read in part as follows:

"Observation of many applications for preference ratings on PBX equipment leads me to believe that telephone companies must exercise greater influence over customers' stated requirements, in order to fix them at an absolute minimum.

"I believe that a vigorous effort on the part of those who study and make up equipment proposals (PBX) to impress upon customers the genuine need for keeping telephone facilities at a low minimum will effect substantial reductions in critical material requirements.

"It may be contended that the short engineering period stipulated in WPB Orders results in low minimum requirements. Although the short term engineering does effect a worthwhile reduction over customary periods, it does not prevent the customer from asking (and getting) facilities that are very generous when compared to what they could satisfactorily get along with if all non-essential use were taken out of the picture.

"During normal times, it is not customary for telephone companies to attempt to influence the customer into keeping his requirements at barest minimums, nor to use all possible expedients to save equipment. Now, under the pressure of the critical material and manpower situation, it is imperative that telephone companies accept the responsibility of seeing that the customer's telephone requirements measure up to the absolute minimum in terms of current thinking on this subject. This may require that engineers revise their notions on what constitutes good service standards.

"Some of the factors which, will result in plant engineered to 'barest minimums' are:

"1. The greater use of bridged telephones, both on initial PBX installations, and in connection with personnel growth that may require additions to an existing PBX.

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TEMPEROMETER

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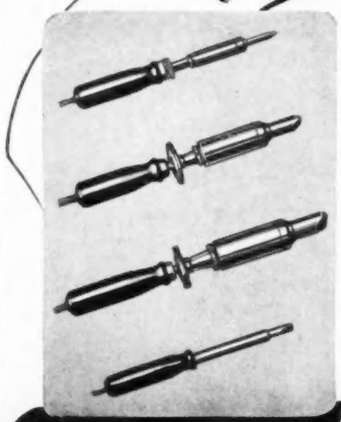

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PREMAX Cuts Labor Cost

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Letters and Metal Pole Markers which are quicker to install, require no maintenance and release labor for essential work in the war effort.

Premax Products
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CHISHOLM-RYDER CO., INC.
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NIAGARA FALLS, N. Y.

"2. Acceptance of slower service standards which recognize that split seconds will not win the war, but that failure to have enough copper for bullets could.

"3. Adequate traffic analyses to determine, not only the amount (this is already being done) but, equally important, the nature of traffic carried on existing facilities with a view to eliminating or limiting personal and non-essential business calls to relieve overloaded equipment.

"4. Study, looking to the reduction of the holding time by a more expeditious conversational procedure. The need for this can be recognized by anyone who will 'tune in' on the average business conversation and note the amenities with which these conversations are accompanied."

Wartime Care of Batteries

Valuable hints on the care of storage batteries, whether in industrial use or in automotive service, are given in the current issue of the industrial edition of EXIDE NEWS, under the heading of "The Great Devourer." Free copies are available to plant executives, maintenance men, and others who are interested. Address: The Electric Storage Battery Company, 19th St. and Allegheny Ave., Philadelphia, Pa.

Maintenance Booklet Offered by Kellogg

"Seventy-Five Ways for Telephone Folks to Help Win the War" is the title of a new book just published by the Kellogg Switchboard & Supply Company of Chicago. The "75 Ways" are hints, tips and suggestions on the maintenance and repair of existing telephone equipment.

Prepared to meet a need for a condensed manual on desirable maintenance practices, the book makes an especially timely appearance. Faced with the need of making present equipment out-last the war, telephone companies must perforce exercise greater care than ever before to forestall interruptions to telephone service at a time when interruptions could have the most serious consequences to an important part of the Nation's war effort.

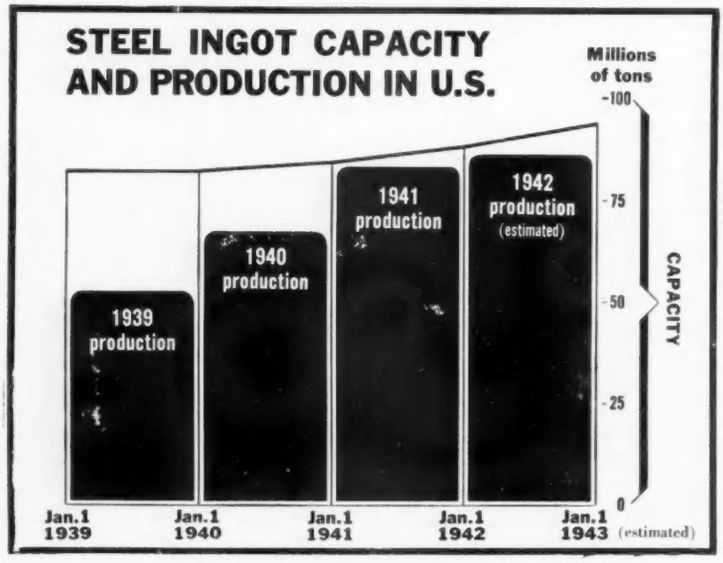
Sub-titled "Getting the Most of What We Have Is a Big Step Toward Victory," the book details "Preventive maintenance" practices for virtually every part of a telephone company's property—the exchange building, the switchboard, main frame, power equipment, outside plant, sub-station equipment, etc. The importance of conserving critical metals—by cutting back switchboard cords, for example—is stressed.

Published in handy pocket size, the booklet is available in quantities to telephone companies that wish to distribute them to employees. It is obtainable by addressing the Kellogg Switchboard & Supply Co., or TELEPHONE ENGINEER.

Nebraska District Meetings

Secretary George M. Kloidy of the Nebraska Telephone Association has announced a very successful series of three district meetings held by that association during mid-November. They were held as round table discussions in Kearney, Columbus, and Beatrice on succeeding days starting Nov. 17.

Subjects of importance included the Revenue Tax bill of 1942, priority and



One for the Book

From Melbourne via International News Service comes word that Lt. Colonel Joseph Stevenot, former president of the Philippine Long Distance Telephone Co., is the man who has made the greatest individual contribution to America's war effort.

Shortly after the outbreak of the war Stevenot quietly entered Gen. Douglas MacArthur's office and turned over to the commander himself, every member of his organization and $30,000,000.00 worth of communication equipment.

Stevenot admitted that he hasn't even a scrap of paper to back up the transaction. "MacArthur's word is enough for me," he said.

conservation orders, and salary and wage control. John H. Schnell, chief accountant for Nebraska State Railway Commission, was present at all meetings bringing first hand information on accounting matters.

Held just before the rationing of gasoline was to become effective Mr. Kloidy felt that further meetings might have to be postponed until the duration.

Authorized to Issue First Mortgage Bonds

The Jamestown Telephone Corporation was authorized Nov. 27 by the New York Public Service Commission to issue $1,000,000 first mortgage 3% bonds to finance redemption of an equal amount of 5% securities. The sale will produce estimated minimum proceeds of $975,000.

"Kentucky" Circuit Rider

We are still chuckling after reading the November 14 issue of the "Kentucky" Circuit Rider. It's a weekly letter to supervisory persons issued by the Ashland (Ky.) Telephone Company. A semi-humorous 14" bulletin with a printed masthead, it closes with the inscription "Keep 'em Talking" flanked on either side with a War Bond Seal and a lineman in full regalia.

In the first issue an appeal is made to the employees to enter into the spirit of the bulletin and to contribute ideas and information. It's purpose as outlined is to discuss topics of interest, personals regarding members of the organization and inspirational subjects to bring about better understanding and team work in the organization. We hope they keep us on the mailing list.

Lack of a Telephone Causes Loss of Home

Mr. B. R. Sage, Association Director from Central Lake, sends in the following interesting newsworthy statement on the value of the telephone in protecting property:

"Only this week, a former subscriber of ours, who owns a ten thousand dollar lake frontage along his farm, and who had his telephone discontinued about two years ago, because he could not afford, one, lost his house and contents by fire. After the fire was well under way, some member of the family ran about a half mile to wake up the caretaker of a boys' camp and call for help, over the telephone."

In times like these when it is sometimes impossible to readily replace buildings, homes and equipment destroyed by fire, even though they are well covered by insurance, it is well to keep our subscribers conscious of the protective value of the telephone by publication in the local newspapers. —From Michigan Association Bulletin

File Company Moves

The Grobet File Company of America, distributors of Swiss Pattern Files and Rotary Files, has announced its removal to larger quarters at 421 Canal Street, New York City.

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TESTS ANY VOLTAGE... 100 to 550 Volts, A.C. or D.C. —Safely, Swiftly, Surely

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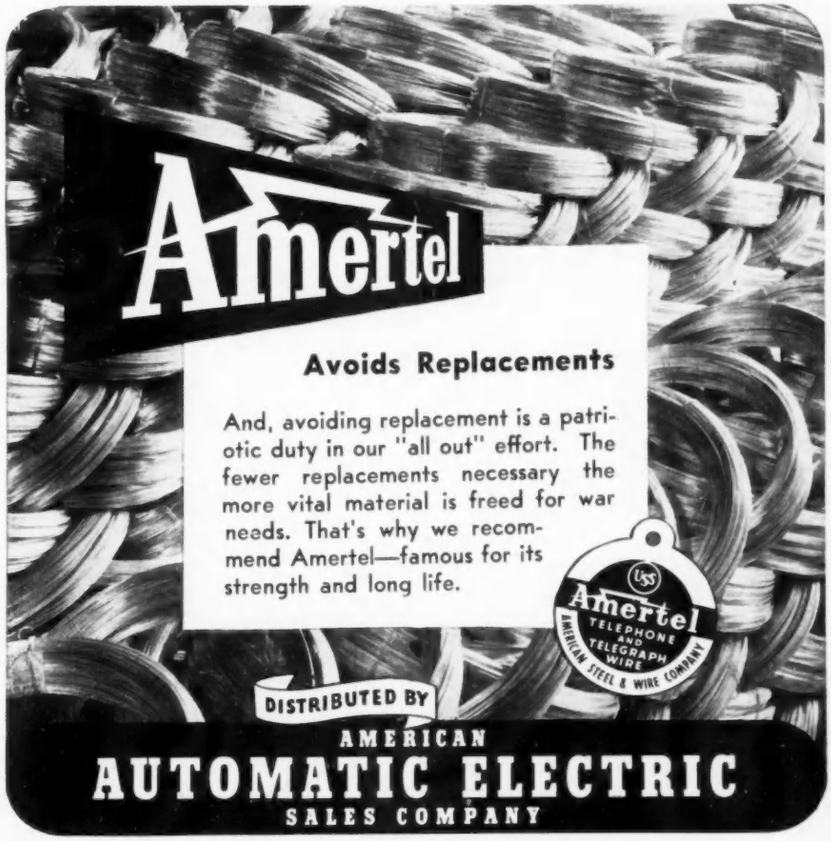
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And, avoiding replacement is a patriotic duty in our "all out" effort. The fewer replacements necessary the more vital material is freed for war needs. That's why we recommend Amertel—famous for its strength and long life.
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Protect Public, Splicer, and Furnace. No. 50 C Shield shown here. Of 22 Ga. galvanized steel. Reinforced edges. 23"x17" x17". No. 50 — four-sided with grate. No. 50 A — same without grate.

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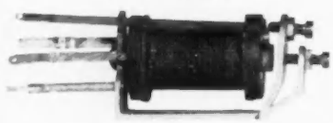

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This corresponds to a similar action at the November 27th meeting last year, except that at that time the dividend was made payable December 24th. To lighten the load of mail on the Post Office at Christmastime, and to assure that most, if not all, of the stockholders receive their dividend before Christmas, the date has been advanced.

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"As chairman of the Maritime Commission's board of awards, I take pleasure in advising you that the board, in recognition of outstanding production achievement, has awarded your Newark, N. J., plant the Maritime "M" Pennant, the Victory Fleet Flag and the Maritime Merit Badges for all plant employees."

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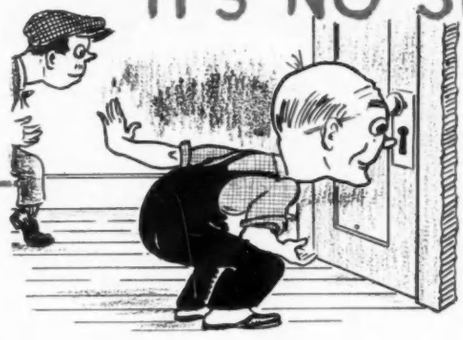

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